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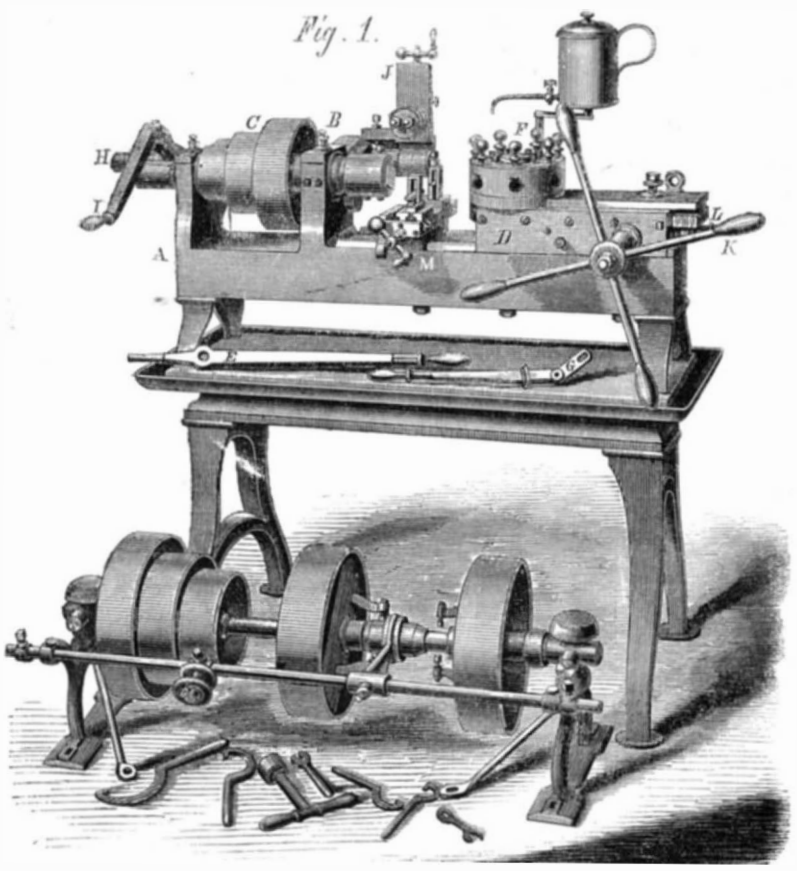
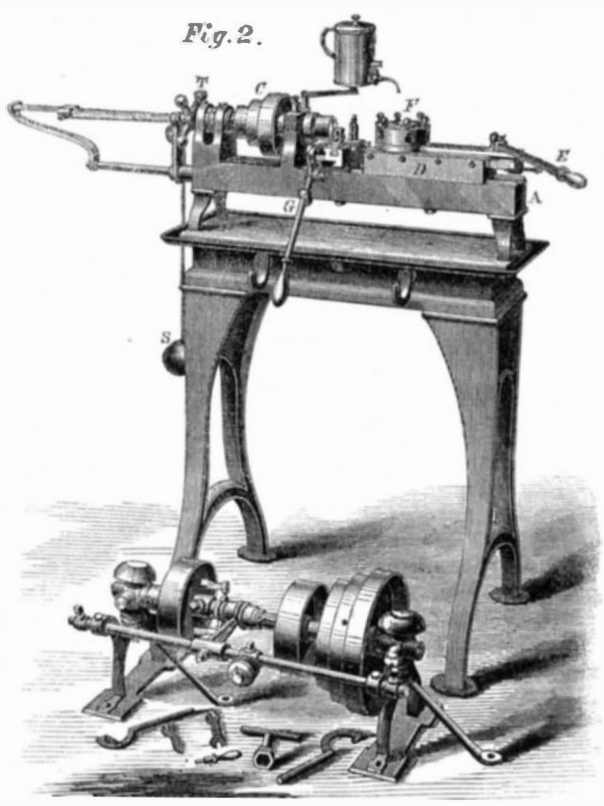
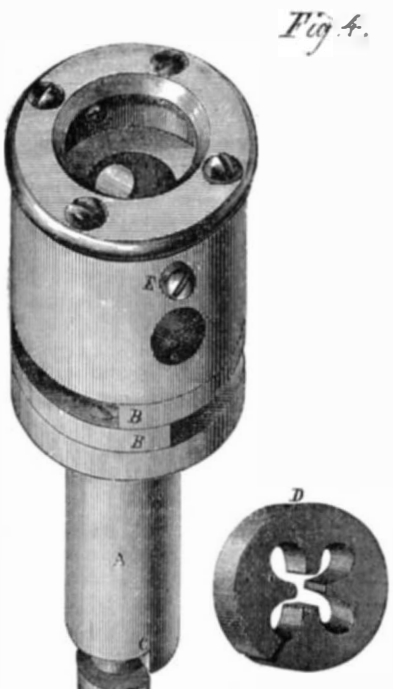
Improved Screw and Stud Machinery.

Want of uniformity in the screws used in connecting parts of machinery is a source of trouble and expense both to the manufacturer and operator, so that in many cases what was at first supposed to be the cheapest article becomes in the end the most expensive. The difficulty in producing studs and screws of various kinds perfectly uniform and interchangeable, has been principally owing to the imperfect machinery used; imperfect not only in workmanship but in construction, and especially wanting in devices to compensate for the wear which will unavoidably take place in the running parts. To furnish machinists and others requiring a variety of screws with a tool that will make them rapidly and accurately has been the aim of the machines engraved in our present number.



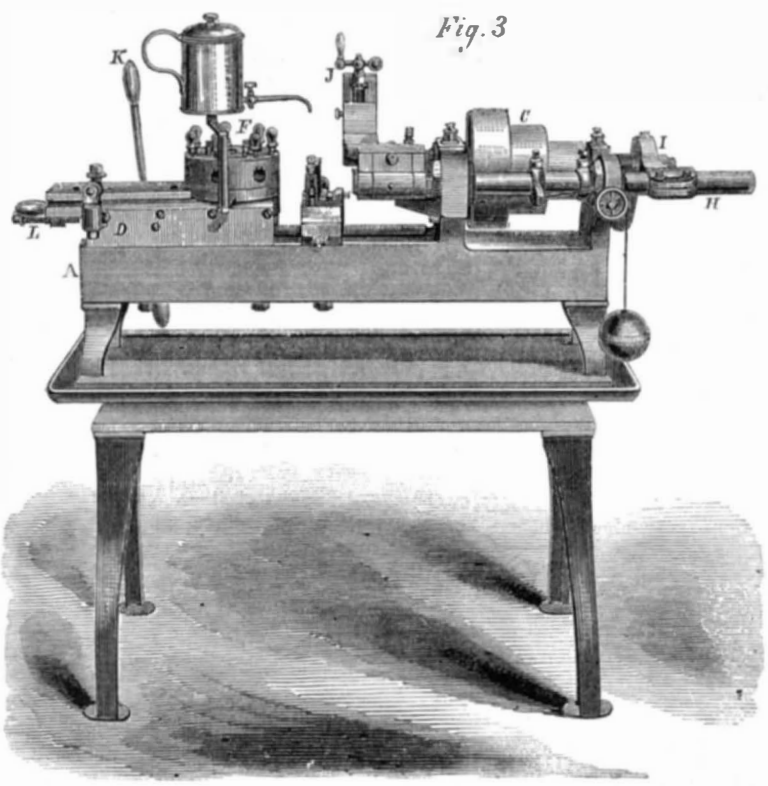




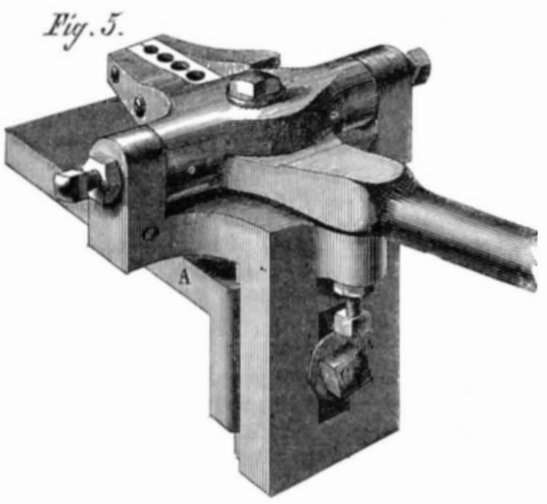
J. R. BROWN & SHARPE'S SCREW AND STUD MACHINERY.

The annexed engraving, Fig. 1, represents a machine suitable for making from bar iron all kinds of screws and studs ordinarily used in a machine shop, and at less than half of the usual cost for labor. It is styled the "No. 1 Screw Machine." Nuts can be drilled, tapped and one side faced up, and many small parts of sewing machines, cotton machines, gas, and steam fittings made on this machine, with a great saving of time and labor.

The bed, A, which is of cast iron is very heavy, and has at one end two uprights cast solid with it containing bronze boxes to support the spindle. The front box, B, is made in four parts that it may be closed up to compensate for wear, the two middle pieces being forced in horizontally toward the center of the spindle by the screws on each side of the box. The spindle is of steel and has only one flange or collar, which is outside of the front box. Between this flange and the end of the box is a hardened steel washer. The cone pulley, C, is kept from turning on the spindle by a spline. Back of the pulley is a nut by which it can be forced forward and its hub kept up to the rear end of the front box. By these devices the front journal can readily be kept tight though considerable wear should take place. Should the spindle heat by continued use it will not bind endwise nor will its expansion lengthwise affect the accuracy of the work done on the machine. The spindle is hollow, the hole being one and a quarter inches diameter, and has on the front end a steel chuck with screws and jaws for adjusting and holding the iron bar or wire from which the screws are made. On the rear end of the spindle is a leading screw and in the hand lever, I, a section of a nut, which fits into this screw. The bar, H, is fitted to slide endwise in bearings parallel to the spindle, and carries on its front end a tool head, J, and to the rear end the lever, I, is attached. A screw thread can be cut with this device, a bar projecting from the chuck on the front end of the spindle with a tool held in the head, J, on the front end of the bar, H. At the other end of the bed of the machine, resting upon two V-shaped ways, is a rectangular piece, D, which can be fastened at any point by two screws from underneath.



Upon and attached to this is another piece, which is fitted to slide in a direction parallel to the bed, and is moved by the hand wheel, K, connecting by means of a pinion and rack, or, for light work, by the hand lever, E, substituted for the hand wheel, K. On the end of this sliding piece nearest the spindle, a round head, F, is so arranged as to revolve horizontally. In the edge of this head are seven holes which serve to hold the mills, cutters, and dies used in making screws. The head is held very firmly in its place, while the cutters are operating by a steel pin which comes up through the piece on which the revolving head rests, at the point nearest the line of the spindle. This pin is hardened and slides through a hardened steel bushing, and the upper end, which is tapered, enters into hardened bushings in the bottom of the revolving head. These steel bushings are ground inside and out after hardening, and the pin is afterward ground into them so that the point fits them all alike. When the revolving head is moved back this pin is withdrawn by means of a short lever, the fulcrum of which is attached to the sliding piece which supports the revolving head, one end being connected with the pin and the other striking an inclined plane in the lower piece, D, which is fastened to the bed. The extreme back motion given to the sliding piece carrying the revolving head by the hand wheel, K, brings a star wheel on the under side or the revolving head in contact with a dog projecting upward from the lower piece, D, which causes the head to revolve far enough to bring the next tool in a position ready to operate on the screw. When the revolving head is brought forward, the star wheel slips over the dog and the pin enters the hole in the head, being forced up by a spring acting on the rear end of the short lever, after which the tool commences to operate.



There is an arrangement whereby any wear in the center hole of the revolving head can be compensated for, and there are two gibs, one on each side of the sliding piece, carrying the revolving head, to adjust its position or to close up for wear. At the outer end of the sliding piece, projecting underneath it, is a screw, L, which can be set to limit its motion. The tools in the revolving head are each held by two screws, by which they can be adjusted as required for the different cuts on the work. Shoes are inserted underneath these screws to prevent the tools they hold from being injured. Between the spindle and revolving head, and attached to the bed is a slide rest operated by a crank, M, attached to a screw or for light work, by the hand lever, G. It has two steel posts, one at the back sliding in a groove parallel with the ways of the machine, and one in front sliding in either one of two grooves, side by side, but which are at right angles with the one at the back end. Both of these tool posts can be raised or low

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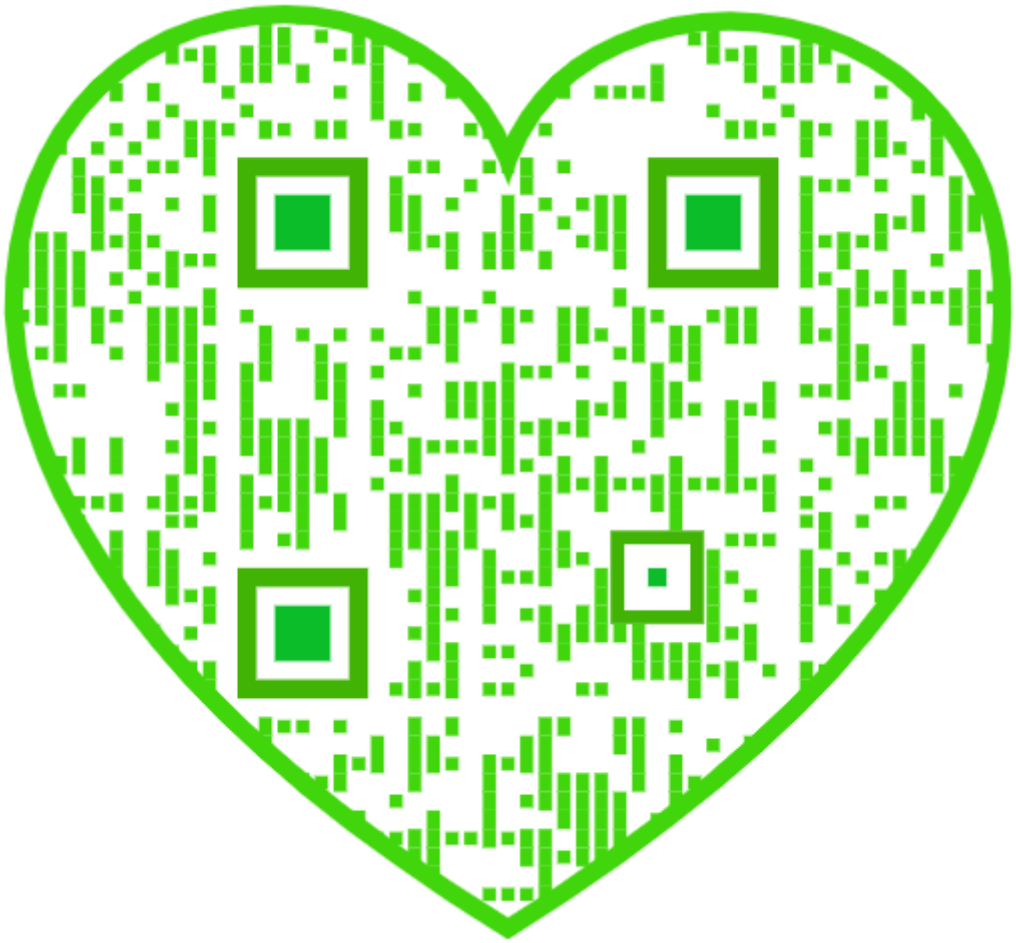

ered to adjust the tools. The bottom piece of this rest is planed on the ways of the bed, and can be moved upon them to any position required. The tools in this rest may be used for cutting off, pointing, or grooving, and their movements may be limited by set nuts upon a screw underneath the rest. Oil is supplied from the can placed above the revolving head, to the cutting tools, when the machine is in operation. The machine is set upon an iron table having a channel around the edge to catch the oil which is conducted by tubes to a pail hung underneath the machine. The overhead work, which is shown in a reversed position on the floor in front of the machine, has two of Brown's patent friction pulleys by which the motion of the spindle can be changed at will. One of these machines has been sent to the Universal Exposition at Paris, and will be exhibited there in operation. The No. 4 screw machine, Fig. 2, is of the same general construction as the one previously described, but much lighter and especially intended for making small screws, such as are used by sewing-machine manufacturers, gunsmiths and clock-makers. The spindle has a hole bored through it seven sixteenths of an inch in diameter, and is provided with a patented device for opening and closing the jaws in the chuck which hold the wire from which the screws are made. The motion of the hand wheel, T, opens the jaws, the weight of the ball S, then moves the wire endwise till it meets a stop placed in the revolving head, F, and another motion of the hand wheel, T, closes the jaws holding the wire firmly. These operations are performed in an instant, without stopping the machine, and effect a great saving of time in making small screws. The revolving head in this machine is made entirely of steel. A screw machine of a size between this and the one previously described is also made; shown in Fig. 3. Similar letters indicate like parts.

In threading screws and in tapping it is often desirable to cut the thread up to a shoulder or to a given point, or to run the tap into a shoulder or a given distance and positively no further, and this is necessarily quite a difficult and delicate operation, requiring great expertness to avoid breaking the threading tool. The engraving, Fig. 4, represents a patented device to remedy this difficulty, without regard to the expertness with which it is operated. It consists of two parts, one sliding within the other. The small end, A, of the outer piece is inserted in one of the holes in the revolving head of a screw machine and fastened there by the two screws. The inner piece, in which the die is held, is free to move endwise, but is kept from turning around in one direction by two jaws, B, one projecting from the end of the inner and one from the end of the outer piece which lock the two parts together. When the die holder is in use in the machine, the revolving head, F, is kept moving forward till it is stopped by the screw, L, Figs. 1 and 3, when the inner part holding the die is drawn forward by the screw being cut, till it unlocks from the outer part, when the forward motion of the die instantly ceases and it merely revolves. The motion of the spindle is then reversed and the revolving head moved back by the lever, E, Figs. 1 and 2, or hand wheel, K, Fig. 1, which locks the two parts of the holder by another clutch, C, at the small end, the jaws of which are in a reversed position from those first mentioned, and the screw turns out of the die. The large end of the holder has a recess for the die, D, which is held in its place by a cap screwed over the outer end. The die used is split on one side and two screws, one shown at E, Fig. 4, are inserted in the holder to close it up when wear takes place. The engraving shows the actual size of die holder used in a No. 4 screw machine. In tapping, the large end of the inner part of the holder is made with a socket to receive a tap which is held in its place by a set screw.

Quite an expensive machine is often used by gunmakers and others for slotting the heads of screws, but the device shown in Fig. 5, and which can be attached to an ordinary hand lathe, is believed to be quite as efficient for the purpose and certainly much less expensive than many machines heretofore made. A single bolt fastens the platform, A, of this apparatus to the bed of a hand lathe, the long lever projecting in front at a right angle with the bed. An arbor carrying a circular cutter is held in the centers of the lathe. The long lever is moved horizontally to open the jaws for inserting and removing the screws, and downward to bring the screw against the saw to be slotted. A stop screw, B, governs its downward motion, and thus regulates the depth of slot in the screw head. The working part of the apparatus can be raised or lowered on the platform front by means of the bolt, C.

These machines and appurtenances are manufactured by J. R. Brown & Sharpe, 115 South Main street, Providence, R. I., who will answer all communications relative thereto.

TREATMENT OF ANIMAL REFUSE IN EUROPE.

[Translated from the "Erganzungsblätter" for the Scientific American]

WORKING UP DEAD HORSES.

Two manufactories for the utilization of dead horses have been established in Germany, one in Leipsic, Saxony, and another in Linden, Prussia. The blood is manufactured into blood albumen, dried blood or blood manure; the hides are sold to tanners; the hair is separated into tail hair, carded hair for stuffing, and very short hair for manufacturing carpets; and the hoofs are used for manufacturing common buttons, manure or blood alkali.

The skinned animal is quartered and put into large cylindrical boilers, which are hermetically closed and kept under a steam pressure of two atmospheres. The condensed water softens the meat off and is then run off through a cock. When this water begins to run quite clear the cock is shut, and the steam is allowed to operate for about eight hours. It melts the grease out, converts the skinny and stringy parts to glue, and even softens thin bones. Each cylinder contains three or four carcasses lying on a sieve bottom, under which an impure deposit of glue is formed, with a layer of pure grease above the glue. The melted grease flows off through a cock. It is liquid when kept at a medium temperature, is especially good for oiling machinery and wool, and makes a soap which is well adapted for the cloth manufacture. The glue, which of course contains also extracts of meat, is so changed by the heat that it can be used only for manufacturing bonesize, an article used in cloth manufactories, which remains permanently liquid and will not spoil by keeping. The next process is to crush the meat and bones to a yellowish powder (worth $3½ to $4 per cwt.) which, according to Mr. Wicke's analysis, contains ·0568 per cent of moisture, ·5687 of organic substances, ·0653 of nitrogen, and ·3745 of ash. The ·3745 per cent of ash is divided into ·2989 per cent of phosphoric salts (·1391 per cent of phosphoric acid), ·0033 of potash, ·0034 of soda, ·0441 of lime ·0041 of magnesia, ·0104 of sulphuric acid, and ·0043 of chlorine.

FISH GUANO.

Artificial manure is manufactured of fish offal and spoiled fish, in the following manner, on the Lofoden Islands (Norway and Sweden).—They dry and grind the back bone and head, cut the other remains into small pieces and pile them with layers of fresh burnt lime, in pits stoned up and bottomed with clay upon which is placed a layer of turf ashes five inches thick. The mass is mixed together after six or eight months and packed in bags.

FISH MEAL.

This novel description of food was shown at the late exhibition of fishery articles in Bergen (Norway and Sweden), as prepared by the Lofoden Company, the only establishment of its kind. The flesh of the haddock is dried hard and crushed, the bones having been carefully taken out. The meal is then heated and stirred in pans to drive off the rank odor, after which it tastes rather sweet. As food it is said to surpass beef four times and fresh haddock four and a half times. It is sold at fifteen cents a pound.

Science Familiarly Illustrated.

Electro-Metallurgy----Electrotyping and Electroplating.

The things needed by the electro metallurgist are a galvanic battery and solutions of the metals to be deposited.

THE BATTERY.

Procure a piece of sheet zinc two inches square and a piece of sheet copper of the same size; the thickness is not material. Lay one of these pieces or plates on the tongue and the other under it. Now bring the outer edges of the plates into contact and instantly a peculiar and indescribable sensation will be felt on the tongue, and, if you are very sensitive and the experiment be made in the dark, a faint flash of light will be seen. This sensation is a mild form of the electric shock; the plates and the saliva have generated a current of electricity which has pervaded the tongue. Now solder a copper wire two feet in length to each of the plates and immerse them in a mixture of water 15 parts and sulphuric acid 1 part contained in a large tumbler or earthen cup, taking care that neither the plates nor the wires touch each other. Bring the ends of the wires in contact with the tongue, each one touching at a different spot. The same sensation as in the first case will be felt. Place one wire in the mouth and bring the end of the other in contact with any part of the body which is peculiarly tender and sensitive as where the skin has been broken by a fresh cut or scratch and a slight shock will be felt instantly as the wire touches. The current of electricity generated by the metals and acid is here compelled to travel through the whole length of the wires and through the body Our little apparatus is a galvanic battery and we have been generating the same force which flows through the Atlantic cable, operates all the telegraphs and is the friendly genius of the electro-metallurgist.

The free ends of the wires are the poles of the battery, and for distinction we will call the one attached to the zinc plate the zinc pole and the other the copper pole.

THE METALLIC SOLUTIONS.

Procure a strong solution of sulphate of copper, sometimes called blue vitriol and blue stone, and into it immerse the poles of the battery, so that they shall be within half an inch of each other. Immediately the zinc pole will be observed to be covered with a layer of clean new copper, and if the experiment be continued for a day the deposit of copper on the zinc pole will be found to have a considerable thickness and may be measured and weighed. In the mean time the copper pole has diminished, it has evidently been dissolved.

Fasten a piece of lead, brass, or charcoal, by means of stout twine to the zinc pole, and immerse it into the solution, while all other arrangements are as before, and the lead, brass, or charcoal, will be soon covered with a layer of copper. In short it is only necessary that the object attached to the zinc pole shall be a conductor of electricity to ensure that it shall be completely coppered.

Let the object attached to the zinc pole be a small coin or medal which has been oiled and wiped dry so that the copper coating shall not adhere too firmly and after the copper has become thick enough it may be peeled or stripped off and will be found to be a copy showing the minutest details of the original. No process is known by which copying can be done so perfectly. It should be noticed that the copy is the reverse of the original as to right and left, and relief. But the copy may now be used as a model and a copy from it will be a fac simile of the original.

If in place of our solution of sulphate of copper we had used a solution of silver or gold without changing anything else, we would have had deposits of silver or gold. In short we might have used a solution of almost any metal, and in the same way have obtained a deposit or coating of it.

The readers of this article surely now begin to perceive that the fog which in their minds has enveloped the subject of electro-metallurgy begins to lift; the mystery may prove to be no mystery at all. A battery, an object attached to its zinc pole and immersed in a metallic solution—that appears to be all there is in it. There are without doubt plenty of men with no more hint than we have here given who might with their own brains and hands elaborate the art in all its details and become masters of it. But we think it desirable in these days when people are in the habit of running and find so little time for labor and study, to throw a little more light on the path of the beginner. We will answer a few such questions as to what is the best form and size of the battery, and what kind and strength of solutions to use with it.

The battery we have described is the original battery of Volta, and was thought a great deal of fifty years ago. But like all inventions it was not left perfect by the inventor. To day it is not used at all for practical purposes in its primitive form; it may indeed be used with fair success, but no one wants it in the place of what is vastly better. Fortunately the improvements in Volta's battery can easily be made plain. In the first place, it was found advantageous to have two plates of zinc to one of copper. The plates are all of the same size, and the copper plate is placed between the zinc plates. The plates are kept apart by fastening their upper ends into parallel slits sawed into a light strip of wood, which strip of wood being longer than the width of the plates rests by its ends on the edge of the battery cup. The two zinc plates are joined together by a copper strip passing over the top of the copper plate. Next it was found that a silver plate might advantageously be substituted for the copper plate, and that the silver plate would greatly be improved by depositing on it the metal platinum. Finally this kind of battery is perfected by thoroughly amalgamating the surface of the zinc plate. The battery as thus described is called Smee's and is almost universally in use among metallurgists. To recapitulate: the best battery has a platinized silver plate sandwiched between two amalgamated zinc plates. As to the size of plates, we suggest that 8×4 inches will be most generally useful.

As to kind and strength of solutions. No solution can be practically used which has a chemical action on the metal or other surface upon which the deposit is to be made. This important fact brings the appropriate solutions within very distinct and very narrow limits. Metallic cyanides may be used in any case. To make the whole story very brief we may say that cyanide solutions are the only solutions actually much used except sulphate of copper, and whenever sulphate of copper attacks the object to be coppered, cyanide of copper must be substituted. Metallic cyanides are generally insoluble in water and are therefore dissolved in a solution of cyanide of potassium. A little more, say 10 per cent of cyanide of potassium, is used than is actually needed to secure the solution of the metallic cyanide. As to strength it is sufficient to say that the solution of sulphate of copper should be saturated, and that a silver solution should contain an ounce of metallic silver to the gallon. and that a gilding solution should contain half an ounce of gold to the gallon.

An expert chemist will not at all be troubled about cyanides of gold, silver or anything else, but if he need them will go straightway and prepare them, but others ask for more of our aid and we give some short cuts to what they may want.

TO PREPARE A GALLON OF GILDING SOLUTION.

Dissolve half an ounce of gold in aqua regia; evaporate to dryness, at first heating as rapidly as you please but towards the end using a water bath. Dissolve this chloride of gold in eight ounces of water and add gradually a strong solution of cyanide of potassium. The first effect of the addition is to make a turbidity or precipitate. Continue the addition till the liquid becomes clear; this is a sign that the cyanide of gold first formed is completely dissolved. Add ten per cent more of the cyanide of potassium and finally sufficient water to make up a gallon.

TO PREPARE A GALLON OF SILVERING SOLUTION.

Dissolve 1½ ounces nitrate of silver in 8 ounces of water. Into this pour, drop by drop, stirring all the time, a strong solution of cyanide of potassium as long as a white precipitate forms. This precipitate is cyanide of silver. Let it rest till the powder goes to the bottom and the liquid is clear, when you decant the liquid, and fill up with water, stirring up the powder with the water. Rest and decant again. And again put in water, rest and decant. The object of all this is the purification of the powder by washing. On the powder pour a strong solution of cyanide of potassium until it is dissolved; add ten per cent more, and finally fill up with water to make a gallon of solution.

Cyanide of copper solution is made by precipitating cyanide of copper by mixing solutions of sulphate of copper and cyanide of potassium, and dissolving the precipitate in cyanide of potassium.

Resumè: Smee's battery, sulphate of copper, cyanide of potassium, copper, silver and gold are the repertoire of the electro-metallurgist, and with these he may copy the form of anything and practically transmute the base metals into gold and silver.

Screw Patent.—The representatives of Thomas W. Harvey, deceased, have filed another memorial asking for extension of his patents for manufacturing wood screws, which was referred to the Committee on Patents. This application failed in the last Congress, and we presume it has no more merit now than then

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Editorial Summary.

A CURIOUS FOOD used by natives in certain parts of Mexico, has been investigated by Dr. Phipson, of England. It consists of the eggs, or rather egg shells, of a kind of boat-fly called *corixa mercenaria*, which are abundantly deposited upon the reeds of certain fresh water lakes, and are collected by the inhabitants, dried, and ground into flour. The eggs are smaller than a pin head, and on a microscopical examination it was found that the larvæ had escaped, leaving only the rigid envelope or shell, which is composed almost entirely of chitine with only 5 per cent of mineral matter, and 6·2 per cent of nitrogen. Chitine is maintained to be a glucoside, yielding glucose and lactamide to the action of mineral acids. The abundance of this insect product may be inferred from the statement of d'Aoust that they contribute to the formation of a new oolitic limestone at the bottom of the lakes referred to. Was the manna of the Israelites a deposit of this kind wafted on the wind?

MINE EXPLOSIONS—A NEW REMEDY.—The French journal *Cosmos* suggests a very simple expedient for removing the dangerous gas from mines, which is nothing more or less than that of burning it! As this gas burns quietly in the open air, and requires mixture with air in certain proportions, to become explosive, it seems probable enough that if the mine were at all times brilliantly illuminated in every part with burning lights, the gas, when gradually evolved, would be consumed in detail and not suffered to accumulate until it reached the explosive proportion. But as this expedient would evidently present no remedy, but rather certain disaster, in case of the sudden liberation of a large volume of gas from a concealed reservoir, it is only worth mentioning as an interesting paradox—fighting fire with fire.

PERFECT COMBUSTION OF FUEL is claimed in a new English stove, with which no flue or chimney is used; although vent is provided for a small residuum of gas, if desired, through a half-inch pipe. The effective principle consists in making all the gaseous products of combustion pass into a chamber filled with the patent molded peat charcoal, which is said to have the property of absorbing carbonic acid and other gases and burning with a very small supply of air, until entirely consumed. In all stoves, wherever the strength or draft, the form of the grate or the nature of the fuel admits of lighting the fire at the top, a material saving of otherwise lost gases may thus be effected, the mass of fuel being roasted and a large portion of its gases disengaged and burned before it becomes itself incandescent.

AN EMBRYO ENGINEER suggests to an English journal that a monitor might be sunk by a broadsider by rolling off the deck of the latter, at close quarters, a weight of material equal to the tunnage of the former. That is, it would be a good plan for every ship to carry into action an extra deck load for sinking purposes heavier than any other ship could float under. The higher ship would have so much the worst of it that she would capsize her deck load, if not herself, before getting near the monitor. This kind of deposit would be like salt on a bird's tail—very effectual, perhaps, if one could get it there and keep it there.

IMPROVEMENT IN MATCHES.—To avoid the use of phosphorus in matches, the third edition of Kapp's Technology proposes the introduction of nitromannite (8 parts) with 3 of sulphide of antimony, 16 chlorate of potash, 1 bichromate of potash, 10 read lead, 4 powdered glass, and 5 gum. Nitromannite is prepared by treating mannite with nitric acid or a mixture of nitric and sulphuric acid, in the same way as cotton for the manufacture of gun cotton.

COMMUNICATION WITH THE GUARD is guaranteed to the British railway passenger by a compulsory bill which has been introduced in the House of Commons. If this bill becomes a law, it will be interesting to know what particular pyrotechnical device will be adopted for fulfilling the requirement. We observe, however, that a signal operated electrically is now proposed, which seems to be free from difficulty or inconvenience.

THE MACHINERY COURT of the Paris Exposition is 110 feet wide and 4000 feet long; although its annular form allows a perspective of less than one fourth that length. It is 82 feet high, and is lighted by a continuous range of lofty windows commencing 30 feet from the floor. A double central range of iron columns supports the shafting, over which runs a gallery 16½ feet wide, for spectators.

AN ELECTRIC BUOY LIGHT, employing Geissler's tube, is proposed, for the purpose of maintaining a permanent light without the necessity of frequent communication with the shore, enabling buoys to be lighted in positions where they cannot be attended to in the ordinary way. A Giessler's-tube lamp has recently been devised by a French inventor for the safety of miners.

SUPERHEATED STEAM.—A company has been organized in this city, composed of several very respectable men, for the purpose of introducing Carvalho's patent for superheating steam. We are assured that the apparatus is very durable, and insures pure dry steam of any required temperature. The Company advertise in another column.

PRUSSIAN RAILWAY BRIDGES are required to be built with chambers in the piers arranged according to military directions, so that they can be effectually blown to pieces below the water level, in case of military necessity.

A LIFE PRESERVER.—The simplest invention we have heard of lately—and yet it may be none the less valuable for that—is that of cutting a bung in a cask, big enough to admit a man's body, weighting the opposite side with suspended ballast to keep it in position, and lining the aperture with a canvas sleeve having a drawing string by which it may be tightened around the waist of the occupant, to exclude water. A supply of provisions and fresh water inside the cask will do no harm to craft or voyager. This life preserver has been tested in heavy breakers with perfect success, it is said; the suspended ballast completely maintaining the proper position of the cask, and acting on the beach as an anchor, so that when once cast ashore, the cask was not carried back to sea with the wave.

FAST OCEAN STEAMERS.—A leading English ship builder has designed a class of steamships for the North German Lloyd's Company, to make the passage between Falmouth and New York in 7½ days, or at 16½ knots an hour. The ships are to be only 330 feet long, by 48 feet beam, and 27 feet hold, but are to be propelled by a pair of monster diagonal compound engines using 6,000 indicated horse-power. The high pressure cylinders are to have a diameter of 80 inches, and the low pressure 160 inches, with 9 feet stroke. Total tonnage, with 1,000 tuns of coal and 1,000 tuns of freight, draft 21¼ feet, 5,900 tuns.

A SMALL ELEPHANT.—The famous gentleman who won an elephant in a raffle would not have been so very unfortunate, if his prize had been of the dimensions of one lately imported from Siam by a naturalist in England. This creature is only three feet high, and very docile, in proof of which it is alleged that on his way from the ship, the day of his arrival in England, he walked into a public house like a veritable Briton, inserted his proboscis in a pitcher of beer that stood on the counter, and drank off the contents without spilling a drop.

PNEUMATIC SPRINGS.—Sterne's patent, in use on the Great Western Railway (Eng.) consists of a "pile" of india-rubber rings, separated by brass plates which are inseparably united to them in the process of vulcanization, forming tight air chambers within the rings. The supposed assistance to the spring from the elasticity of so small a quantity of air as that within the rings, would seem to be too slight to be of any consequence, or to justify the term "pneumatic."

TUBULAR PIERS.—The San Paulo Railway bridge over the river Cubatao, Brazil, rests, in four spans of 75 feet, upon three piers, consisting each of three iron tubes or piles standing in a triangle, screwed into the bottom of the river by screw blades attached to their circumference, and united at convenient intervals in iron frames.

TO BLEACH SPONGE SNOW WHITE.—Soak it in diluted muriatic acid ten or twelve hours, then wash with water and immerse it in a solution of hyposulphite of soda with a small addition of diluted muriatic acid, wash and dry it. Repeated operations it is said, will render the article almost snow white.

OZONE AS A DISINFECTANT.—Get a wide-necked bottle and put in half a pint of water, with a cork floating at the top; on this cork fix a bit of phosphorus; cover the bottle with another bit of cork very loosely. This apparatus may be moved from room to room, remaining till the characteristic smell of ozone is perceived.

IMPORTS AND IMPOSTS.—Walker's comparative tables for 26 years past show that no correspondence exists between the rate of duties and the volume of imports; but that the volume of imports and the volume of *currency* correspond in a remarkable degree. The rate of interest is shown, by similar tables, to have fluctuated under the same influence.

THE ENGLISH WATCH TRADE confesses to a serious decline and discusses the causes. The number of Swiss watches imported into England for sale is now stated at 35,000 a year, while the number manufactured in England is only about 26,000.

ALUMINIUM LEAF.—It is reported that M. Degousse, a gold beater in Paris, prepares aluminium leaf weighing only .01544 grain to the square inch, burning with great brilliancy in the flame of a spirit lamp, and decomposing boiling water.

ANOTHER GUNPOWDER.—Nitrate of potash, 10 parts; picric acid, 10; bichromate of potash, 8·5—intimately mixed—give, according to Dr. Borlinetto, professor of chemistry in the University of Padua, an excellent gunpowder of the best sporting quality.

A NEW STEEL FOR SHOT.—Deuss, a Norwegian steel maker, has excited Prussian military circles with a quality of steel by which heavy armor was penetrated repeatedly with the same shot.

OILS AND BEARINGS.—We observe an announcement from Huger that the higher American oils contain a considerable amount of bisulphide of carbon, which may have something to do with an injurious effect upon bearings and journals.

THE PROPOSED LONDON AQUEDUCT to bring water from the Westmoreland Lakes, as estimated, will be 138 miles long, deliver 83,000,000 gallons a day, and cost over $22,000,000.

PENNSYLVANIA, among other things, will be represented at the Paris Exposition by a lump of anthracite coal weighing six tuns. Montana sends a bar of gold worth about $100,000.

SURGICAL POISONINGS.—M. Maisonneuve, in a paper read in December before the French Academy of Sciences, maintained by reasons and statistics the startling position that at least 85 per cent of persons who die in consequence of surgical operations, die of poison. The poisoning is communicated by the lymph and other living liquids which become exposed in the wound, and after putrefying penetrate the cellular tissue and the orifices of the lymphatic vessels, producing the inflammation which is so prominent a cause of death in surgery, or else enter the circulation, vitiate the blood, and remain in the capillary vessels, giving rise to secondary symptoms of dangerous character, such as erysipelas, anthrax, etc. These consequences are prevented by the various improved means of arresting the putrefying process, destroying its products, or shutting them out of the system, and the mortality in hospitals where these methods have been introduced, has already been greatly diminished.

A MONSTER FILTER.—A singular proposition has been made by Mr. Tilford Macnell, with a view to supplying London with pure water. He proposes to use the Bagshot sands, 22½ square miles in extent, as a filter: bringing 125,000,000 gallons of water daily from the Thames just above Teddington, together with 75,000,000 from the green sand hills south of Guildford; the water to be spread over the whole surface, equivalent to a deposit five eighths of an inch deep in twenty-four hours, and to be withdrawn from below the sands in catchwater canals. Assuming that a water-tight stratum of some kind lies beneath the sands at a convenient depth, the plan might be practicable, and the following questions might become interesting:—How long would it take for the Thames to fertilize the Bagshot sands? And how far would the value of the land when thus incapacitated for filtration, go toward constructing new and better waterworks?

STRAW AND CLOTHES BLEACHING.—Bolley states that the hypo-chlorite of magnesia bleaches much more quickly than that of lime, with the further advantage in the case of straw goods, that it bleaches directly as well as quickly, without first coloring the straw brown as does the hypo-chlorite of lime. Magnesia being a much weaker base than lime, parts with the chlorine much more quickly.—The great bleacher is oxygen, and in the form of ozone, nothing oxidable can withstand it. Ozone is said to be rapidly formed when turpentine is exposed to the air, and the writer who mentions this (in a German periodical) recommends laundresses to add to their rinsing water a little pure rectified oil of turpentine mixed (which can be done only by distillation) with twice as much strong alcohol. No smell will remain in the fabric after drying.

CHINESE-AMERICAN LITERATURE.—It is reported that a Chinese lad who has been for some time engaged in a photographic establishment in San Francisco, has occupied his leisure in translating Webster's Dictionary into Chinese. Probably the effort is rather a curiosity than a literary event. But a fact of real importance is that Wheaton's standard work on International Law is about to be placed in the hands of the Chinese in their own language. Old as that nation is, it is obvious that this book will impart the first perception, at large, of the existence of such a thing as international law; unless we should except the rough and questionable lessons of the opium war. Rev. Mr. Martyn, Presbyterian missionary for twenty years in China, is the translator.

ALLOYS WITH MAGNESIUM.—Mr. Parkinson of the School of Mines, says the *Mechanics' Magazine*, in a paper read before the Chemical Society, showed that all these compounds are exceedingly brittle, and most of them are easily acted upon by air. The most permanent alloy is that with zinc, but even this at present seems susceptible of no practical application. The most interesting compound of magnesium with the metalloids, this gentlemen found by strongly uniting magnesium filings with sand, the resulting compound, silicide of magnesium, when dropped into water or dilute acid gives off spontaneously inflammable siliciuretted hydrogen.

IRON MANUFACTURE OF PRUSSIA.—The cast steel of Prussia was worth little over $300,000 in 1850, rose to a million and a quarter by 1360, and amounts now to nearly $9,000,000 per annum. The manufacture of pig, cast and wrought iron has also been multiplied three or four times in the same period; now amounting to nearly $50,000,000 per annum. Our informant does not specify how far the later expansion is due to conquest.

DR. ELSNER has succeeded in sensibly volatilizing carbon, and fully volatilizing silver, gold, the black oxides of cobalt and copper, green oxide of chromium, red oxide of iron, and oxide of iridium, by the temperature obtained in an enamelling furnace at some porcelain works. Platinum resisted this temperature, but platinum black (platinum separated in powder from a solution of one of its salts) was melted into small buttons.

THE BERLIN WARE so much celebrated for its power of withstanding heat, acids and alkalies, is composed, according to Dingler's *Polytechnic Journal*, of 45 parts kaolin, 37½ alumina, and 16½ feldspar. The enamel is composed of 42 parts sand, 33 kaolin, 13 unburnt gypsum, and 12 of the baked body composition above described.

PROFITS OF CHEAP TRAINS.—Legislators and city railroad projectors alike may take a profitable hint from the report of the British Internal Revenue Commission in which they suggest revoking the exemption of cheap trains from duty, as they are found to be among the most remunerative trains running. The fare is less than two cents for one to six miles.

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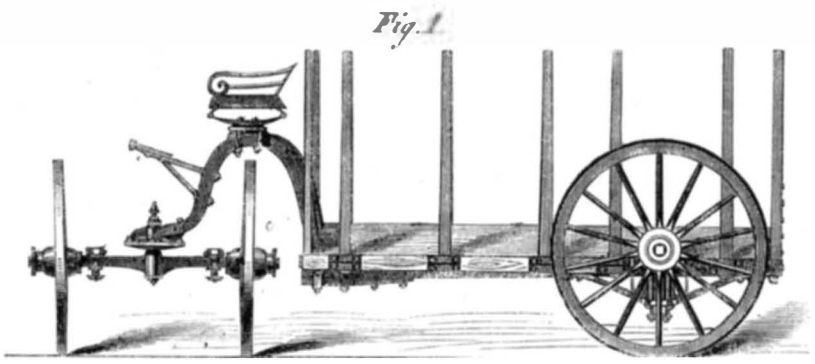
Improved Truck.

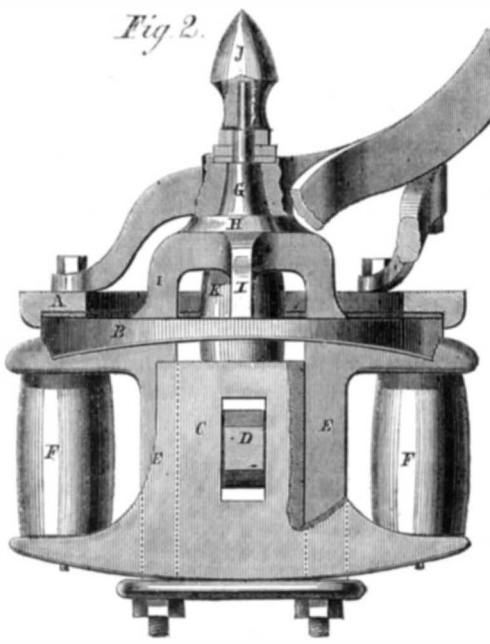
The engravings present views of an improvement in trucks patented through the Scientific American Patent Agency, by Asa E. Hovey of Cambridgeport, Mass., Feb. 26, 1867. It is especially intended for that class of vehicles known as the "California crane-neck trucks." It is intended to give ease in traversing over uneven ground, to prevent sudden shocks and jolts on the axle, and to afford facility in turning short. Fig. 1 is a side view of the truck, and Fig. 2 an enlarged, semi-sectional view of the mechanism connecting the crane necks with the forward axle. There are three of these necks, as seen in Fig. 1, diverging from each other at the back and brought together and welded or bolte d at the front. Here they are connected by bolts to an annular plate, A, of malleable cast iron, having a downward projecting flange around its circumference to receive another annular plate, B, of similar material, a brass washer being interposed between. C, is a yoke, also of malleable cast iron, through which the axle, D, passes being secured to it by a horizontal king bolt which allows the axle to traverse or swing in a vertical plane, to facilitate passing over uneven ground without affecting the equilibrium of the truck. The yoke, C, and plate, B, are connected by bolts, E, which have a large washer, or plate, and nuts at their lower ends. Projections on the plate, B, and yoke, C, furnish supports for cylindrical rubber springs, F. G is a wrought iron pin which has a collar, H, and supports, I, connected with the plate, B. The pin may be placed in a mold and the collar, supports, plate, B, and bars or bolts, E, may all be cast upon it and afterward made malleable. The pin, G, passes up through an eye in the front part of the crane necks and thrusts upwardly against washers, nuts, and a cap, J. The rubber spring, K, is between the upper part of the yoke, C, and the lower surface of the flange, H.

Fig. 1.



HOVEY'S IMPROVED TRUCK.

Fig. 2.



By these devices perfect freedom of motion is allowed the axle, both vertically and horizontally; the springs receive and absorb the jolts and jerks caused by rough roads, and the whole is compact, easy working, and simple.

For additional particulars address the patentee.

Converting Electro-Magnetic Engine.

We learn that Mr. Siemens and Professor Wheatstone have simultaneously produced, before the Royal Society, similar machines realizing the conversion of mechanical into electrical force with remarkable perfectness and almost a minimum of loss. Mr. Siemens' converter consists of a bar of soft iron with a very slight initial magnetism, aided by the small mechanical force required to rotate it within an envelope of copper wires laid parallel to its axis. The electricity thus excited by the slight initial magnetism of the iron, excites the magnet in turn, and this reciprocal excitation goes on in unlimited progression. In the miniature experiment shown, the magnetism developed surpassed the strength of two men, and the heat of the electrical current was sufficient to melt iron wire. The power required being so trivial, and the movement so simple and frictionless, it would seem that these striking results might well have approximated closely to an equivalent for all the mechanical power expended. This is a great result in its practical bearings, particularly on the advantageous conversion of mechanical power into light. Our present mode of getting light (to illustrate grossly) is like keeping up a bonfire or heating a furnace merely to read by. We throw away the most of our light-fuel in the form of heat, which, if converted into steam power and that power passed through electro-converting engines and issued in electric light, might be almost adequate to turn the night into day. It ought not to be long indeed, before night will become merely an optional indulgence.

Laws of Development.

Medical investigation has determined among other interesting facts, that (with the exception of the heart and organs of digestion) the embryo consists at first of two lateral and symmetrical halves, which subsequently come together and are agglutinated upon the median line, so as to constitute one body. Each half being a perfect counterpart of the other, the organs and members in general are thus produced in pairs, as the limbs, eyes, etc., or double, as the brain, nose, lip, chin, chest, etc., of which the double structure, and even that of the whole body, is usually marked by a more or less visible indentation exactly down the line of junction. Another curious fact is that the development always proceeds from the periphery inward, and is effected in the main before the agglutination. Thus, the fingers are formed before the hand and the hand before the arm, the ears before the eyes and the eyes before the nose, and so on. Hence if any local mishap arrests the development, where it stops there it will stay, and so a monster is produced, with the fingers, it may be, growing from the shoulder without an arm, or with the nose wanting, having failed to come forward in season before the agglutination, or even with the two eyes united in one, from a premature agglutination or a tardy development. Excessive evolution, on the other hand, produces supernumerary limbs, or when affecting certain portions of the capillaries, those blood vessels which are naturally too small to be seen with the naked eye, become enlarged so as to carry red blood and produce a red or purple mark in the skin. The tendency of independent formations to agglutinate, sometimes produces a junction of separate individuals as well as of the halves of the same individual, as in the case of the Siamese twins.

The First Eight-Hour Law.

The Illinois Legislature has enacted that eight hours shall be a legal day's work, in the absence of any special contract to the contrary, and the act goes into effect immediately. This experiment can hardly be very decisive, as it applies only to contracts by the day and not to farm labor at all. Our impression is that if generally applied and not evaded by overtime arrangements, the eight-hour plan might operate to diffuse wages more equably, and increase the earnings of many who are now scantily employed, at the expense of the shrewder or luckier class who keep their hands full. If applied as above, only to limited classes of skilled labor, the tendency will be to demoralize trades by introducing a still greater influx of half-taught workmen. The English operatives demand to have over-time work forbidden, for otherwise it can be made practically imperative, when it suits the employer. We are thus reduced to choose between forbidding and compelling a man to work more than eight hours or ten, as the case may be: but as the former would be universal and public, and the latter only exceptional and individual tyranny, there seems no difficulty in the choice. Over-time arrangements will therefore certainly be made wherever work is pressing or profitable, unless a relay system should spring up, giving capital a day of sixteen hours, while labor has only half as much, and the gross amount of wages is divided among twice as many hands as before.

Electricity and Fogs.

The electrical character of fogs was observed by investigators in the last century, and three or four years ago Dr. Meissner, in his "Researches on Oxygen," showed that perfectly dried air or oxygen, when subjected to the influence of electricity in closed tubes, produced a mist which did not disappear on being passed through water. Investigations in this direction by Dr. T. L. Phipson, England, led him to the conclusion that with very few exceptions the existence of a fog must depend upon its electrical state. He found that the dense London fogs are electro-positive, while the smoke of the chimneys is electro-negative, and the two thus attract each other. On the other hand, there is a kind of "dry fog" which is invariably electro-negative, that is, in the same condition as the earth and the smoke, from both of which it is therefore repelled. They appear most frequently in May and June, are perfectly dry, often phosphorescent, of a peculiar odor, and the strongest wind or even rain does not disperse them. These fogs, which are not very common, and do not extend to any great hight in the atmosphere, are supposed to be related to unhealthy, certainly very peculiar, conditions of the air. Tests employed in such a fog showed only feeble indications of ozone.

A Steam Gun Carriage was tried on the 15th with a 15-inch gun on a scow in the Hudson river, in presence of Admiral Farragut and other officers. A steam cylinder is fixed beneath the carriage with its piston connected to the latter, so that steam admitted at the rear runs out the gun and then receives the recoil of the discharge; after which the gun is run in by steam admitted at the other end of the cylinder. The steam loading machinery was also employed, and the whole working of the gun was effected by four men with twice the rapidity attained with forty men on the old plan. Applied in such a manner as to be readily dispensed with in case of accident in battle, these arrangements would multiply the efficiency of guns and men.

Particulars of Dr. Livingstone's Death.

The only particular account of the melancholy fate of the great explorer, yet received or indeed likely ever to be obtained, is derived from Dr. Kirk, formerly a member of Dr Livingstone's Zambesi expedition, and communicated by the U. S. Consul at Zanzibar, Edward D. Ropes, in a report to the Department of State, dated Dec. 9, 1866. We quote the material portion of the statement, from which it appears that the tragedy took place about October 25th.

Dr. L. left Zanzibar on the 9th of March, 1866, for exploration of the river Rovuma and the great lake country of Central Africa. His present expedition may be briefly stated to have been an attempt to unite the magnificent discoveries of late years and determine the limits and connections of the three great lakes which reach from 14° south, to 2° north latitude, flowing to the sea by the Zambesi and Nile at the two extremities, but with an intermediate space, as yet unknown Such was the geographical problem. But Dr. L. had in view to affect the present enormous East African slave trade, through pioneering the way which might lead to lawful commerce.

To have consolidated in one the successive discoveries achieved by himself on the Nyassa; Burton, on the Sangan yika; Speke and Grant, on the Victoria, and Baker, on the Albert Nyanza, would have been a fitting triumph for one who was the first to cross the African continent within the tropical zone; but these hopes have been wrecked by his untimely death.

The last heard of Dr. L. was at "N'doude," at the confluence of the Rovuma and Niende. Here he met with kindness, but found the land desolated by the slave traders supplying the market of Zanzibar. We have information that he proceeded further west to "Mataka," a Miao chief, who gave presents of cattle and food. At this point the Indian sepoys remained behind, and have since returned to Zanzibar. From Mataka to Alake was eight days' march. On crossing a wide water in Canves, they followed the border of the lake for several days, and then struck inland. They were suddenly attacked in a bush country, about 9 A. M., by a band of Mavite; Dr. L. killed the most forward of the attacking party, but was surrounded and cut down by one blow of a battle axe, which cut half through his neck. Beyond this we have no details, for those who returned were the first to flee. Almost all who stood near Dr. L. were killed, although they seem to have done considerable with their rifles. This happened about six weeks ago, or about October 25th. The locality it is impossible to determine.

Only one of the survivors saw Dr. L. fall, but they buried his body at 3 P. M., when the Mavite had gone. They took off the baggage and also the upper clothing of the dead body, so that not even a note remains by which to trace the route.

It is hardly probable that any further particulars will ever be obtained in regard to Dr. Livingstone's death, as the Mavite are a wandering people, and it will be quite impossible to acertain the particular tribe by whom Dr. L.'s party were attacked.

English and American.

A writer in the *British Journal* of *Dental Science*, (Dr. W. H. Waite) remarks that "it is notorious that Englishmen at home are not generally disposed to regard with favor anything coming before them with the simple recommendation that it is "American," and equally notorious is it fast becoming that Englishmen who have once crossed the Atlantic are ready to speak in praise of many things simply because they are "American." Naturally suspicious, until they have proved the merits of a case, they are as naturally warm and confiding when the proof has been afforded. Americans, on the contrary, are naturally open-hearted and free until *compelled* to be suspicious. Hence Englishmen who visit America are startled at first by the unbounded hospitality, urbanity and courtesy with which they are received. . . . The amount of attention paid to this department of dentistry [filling teeth] has raised the quality of the work to a point of which few English operators have any idea. The beautiful and delicate instruments commonly used for gold filling are up to the present time not obtainable in this country at all, except through the agents of American manufacturers."

Improvements in Mississippi.

A letter from Mr. A. Herring, C. E. of the Mississippi Central Railroad, Water Valley, Miss., says he desires some information relative to the repairof laminated or worn rails by railroad companies. He says:

"Patching and mending is a necessity with us. On this road, 237 miles long. we have rebuilt eightmiles of trestle work bridging, sixteen locomotives from burned wrecks, depot houses, etc., and reopened the entire road, having a poor credit to begin on, an exhausted treasury, and anenormous bonded and floating debt Our earnings now are $120,000 per month and our operating expenses inside of $60,000 per month; but we must still economize.

"A new T-rail is worth $16.50; if we can repair rails at an average of $4 each the value of the repaired rail will be $12.50. We pay two old rails for one new one and a quarter of another one for freight, thus paying $28.12½ of old rail for $16.50 of new. In purchasing a mile of iron we lose enough for getting one mile and seven tenths if we had the means of repairing. Will some of your readers, railroad men, help us with their experience?"

Molded Peat is to be applied under an English patent to the manufacture of picture frames, moldings, decorations etc., in the manner of *papier maché* or hard rubber.

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Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Action and Reaction---the Proper Unit of Measure for Force.

MESSRS. EDITORS:—An interesting correspondence under the above caption, appeared on page 137 present volume of the SCIENTIFIC AMERICAN, in which the writer shows a commendable knowledge of facts connected with the points at issue, but as is too often the case, his conclusions appear to be drawn from a doubtful philosophy, rather than from pure philosophical reasoning.

Your intelligent correspondent will not differ with me, when I define force to be "that which, when associated with" matter, "causes it to move." In other words, that which overcomes inertia. He will also acknowlege that gravity and steam are equally absolute forces. Now if in a gun 64 feet long, weighing 16 pounds, carrying a ball of 1 pound a jet of steam sufficient to maintain a constant pressure of 1 pound, be admitted between the breech and the ball, then at the end of 1 second the velocity of the ball will be 32 feet and the quantity of force (steam) applied, will be just equal to the space moved through, 16 feet. At the end of the second, the velocity, space and quantity of force (steam) applied, will be 64 feet. Thus demonstrating that the quantity of force is as the spaces, and as the squares of the velocities. Again, at the end of the first second, the velocity of recoil will be 2 feet, and the space 1 foot, and at the end of the second second, the gun's velocity, space and quantity of force (steam applied), will be 4 feet.

Let 1 represent the amount of work performed by 1 pound moving with a velocity of 1 foot, then, 1 pound (the ball) having a velocity of 64 feet, will perform work equal to $1.\times64^2=4096$ and 16 pounds, (the gun) with a velocity of 4 feet will perform work equal to $16\times4^2=256$. The gun performs just one-sixteenth the work of the ball, with just one-sixteenth the quantity of force (steam). It seems then, that it is not only a rational conclusion, but a demonstrable fact, that the absolute quantity of force in a moving body is exactly equal to its capacity for work, and that the intensities of action and reaction are always equal, but their relative quantities of force, depend wholly on the relative spaces, through which it is applied.

Newton was a remarkable man for the times in which he lived, but erroneous theories, from whatever source, must succumb to the "logic of events." A SUBSCRIBER.

Tenafly, N. J., Feb. 25, 1867.

Printers' "Wants" and "Don't Wants."

MESSRS. EDITORS:—Allow me to call the attention of inventors and builders to a few of the wants and don't wants of the modern disciples of the black art, known as country job printers.

First.—We want a good substantial machine, combining all the good qualities of a lead and brass rule cutter, mitering machine, etc., one that is simple, durable, and when guided by a little common sense and used with ordinary care, capable of doing its work in a smooth, workmanlike manner. There are a number of machines in use for this purpose; but they do not meet the wants of our enterprising job printers of to-day. In fact, there is not a good mitering machine in market, of any kind. Few printers have the skill and patience required to miter brass rule for all the different forms used in a printing office, with no other tools than a pair of old shears and a file. Even if they have the patience they cannot afford the time; for the same work can be done with a good machine in a fraction of the time required by hand, and done much better

Again,—We want a machine to dress wood type, as much of it is uneven in hight, thereby making it almost impossible to do good work, especially on a cylinder press, with the common rubber blanket. Every printer can bear testimony to the vexation and delay of "underlaying," because of the varying hights of the type used in poster work, the variation oftentimes being a full 32d of an inch. This variation is explained by the fact that the type is bought of different manufacturers, no two manufacturers having the same standard of hight, hoping, no doubt, to secure the lion's share of trade by such a saicidal policy. Now, we want a machine with knives or cutters so arranged that we can easily reduce any type which is too high, by cutting off the bottom. Possibly such a machine might be made so as to combine the requisites of a lead and brass rule cutter, miter, etc., all in one, and at a price which would bring it within the reach of all. Certainly there seems to be no great difficulty in the way, and whoever will bring out such a machine may be sure of an ample reward, as every printer in the country feels the need and growing want of one. Inventors, look to this. You can give us such a machine, if you try, and you would have done so long ago, if your modesty had not caused you to shun the abode and acquaintance of that useful, harmless, yet much-abused biped, the printer's devil. But enough for the present of our wants; and now with your permission, Messrs. Editors, let me name some of our don't wants.

In the first place, we dont' want so much poor machinery, engines, presses, etc. In the next place, whenever a press breaks down because of the poor material and workmanship used in its construction, we don't want the builder to fall back upon his dignity and swear that it has been broken through the carelessness or incompetency of the printer. It is a fact, as plain as it is undeniable, that more than one half of all our printing machinery—especially all kinds of job and country newspaper presses are a disgrace to our American mechanics. Why is it? Not that they are imperfect in principle or design, as they come from the inventor's hands, but because of the poor material and worse workmanship used in their construction by the builder, to say nothing of the many presses built so light that they literally "shake themselves to pieces." As an illustration, I will cite an instance in my own experience. Not along ago, the proprietor of the office in which I was employed gave an order for two new presses of the latest and most approved kind. In due time they were shipped by the builder, and arrived, dressed in the gayest attire of bright paint and varnish. The presses were alike in form and pattern. One of them was built in the shop of the patentee, while the other happened to have been built elsewhere. To look at, the presses were alike, but what a difference when set up and pronounced to be in running order! One was actually "thrown together," and was so imperfect in its adjustment that it could not be made to run at all, until the heedless and shameless oversights of the builder had been remdied at an expense of some twenty or thirty dollars; and to day the press stands as a monument of disgrace to the builder, and is actually worthless. But take a peep at press No. 2, bearing in mind that it was built after the same model and form, the same pattern as No. 1, though in another shape and by different workmen. I cannot say too much in praise of this press, for it as perfect as art and iron can make it. Every mechanic and printer looks at it with pride, and well he may, for it has no equal in regard to ease and facility of working, and beauty and rapidity of execution. Manufacturers may shield themselves by saying this is an extreme case. Perhaps it is, but that it is not overdrawn, the two presses, standing side by side, will bear witness.

Much more might be said about poor and cheap machinery, but my letter is already too long, and I trust enough has been said to awaken our inventors and builders to a sense of some of the wants and don't wants of our Yankee job printers.

L. H. P.

Woonsocket, R. I. Feb. 23, 1867.

[As long as human nature is what it is, printers, like other men, must look out for their own "don't wants," by getting their goods of first class manufacturers—not necessarily great concerns, but of proved skill and integrity—regardless of a little difference in first cost, which will very soon be saved in repairs. Second-rate machinery is about the dearest stuff that money will buy; and first-rate machinery *will* cost liberally, and it is not every shop that can make it. We never had or heard of any work from R. Hoe & Co., for instance, that did not give satisfaction in quality *and especially in cost*, when practically contrasted with machinery from professedly cheaper shops. Other equally capable and honorable printers' machinists might be named; but this one is a sufficient illustration of our meaning, and some who have not yet got a hard-earned experience on the subject, may be glad to be assured of *one* way to get along without it.—EDS.

Steel Bridges and Subaqueous Tunneling.

MESSRS. EDITORS:—In the last number of the SCIENTIFIC AMERICAN I noticed a correspondent calling upon engineers to investigate the merits of steel for bridges. Several steel bridges of 100 to 130 feet span already exist in Holland, and at the latest accounts one of 600 feet span was to have been attempted. In the case of a wrought-iron lattice bridge, for one railroad track and single span, we have the proportion between the moving load and the own weight of the complete superstructure, taking our figures from European bridges, built on exceedingly safe principles and with an allowed strain of 8,500 lbs. per square inch, as follows:—

Span in feet.	Proportion of own weight to load.	Span in feet	Proportion of own weight to load.
100	0·6	300	1·44
150	0·8	350	1·64
200	1	400	2
250	1·24		

Or, at 400 feet span it takes two tuns of iron to hold up one tun of load. What we want is a metal stronger than wrought iron, weight for weight, and there is only one such, viz., steel. In building steel bridges the Dutch government allowed a strain of only 8½ tuns (of 2,000 lbs.) per square inch, which is much too small. Double this strain could be taken with perfect safety. But upon the above basis, and taking 4¼ tuns as the allowed strain on wrought iaon, with the same construction (a single span and single track lattice) in both cases, wrought iron and steel compare as follows for different spans:

Span in feet.	Weight of iron bridges in tuns.	Weight of steel bridges in tuns.
100	80	30
150	152·5	58·5
200	260	91
250	387·5	133·5
300	540	180
350	717·5	235
400	920	296

As steel will not cost per weight more than twice the cost of wrought iron, the great saving in favor of steel is easily seen, to say nothing of being enabled by its use to build much longer spans than with wrought iron, which includes a saving in number of piers. A bridge crossing the East River in three spans, that is, having two piers in the river, the piers of masonry till above high-water mark, thence cast iron up to the under side of the superstructure, this of steel and made as a *continuous* lattice girder, with double roadway inside and a sidewalk on each outside, would be a comparatively cheap, a practicable and well appearing solution of the problem. A so-called "fish-belly" girder would be a lighter, hence still cheaper superstructure, but these are rather uncouth and ugly in appearance and would be more difficult, that is would cost more to erect in place, than a continuous lattice.

All this would require only following in the footsteps of others, to accomplish. In my mind a tunnel seems better to answer the requirements of the place, and the same need not cost any unknown or fabulous amounts. Speaking merely from my impressions, I do not think it would cost more than the bridge. It is easier to grade 30 or 40 feet *down* than 100 feet or more *up*. The grade of the tunnel should be as high as ever possible: if too deep it would become (like the Thames Tunnel until a railroad was put through it) a mere "curiosity shop." My plan of construction would be this:—Make two rectangular coffer dams, in length equal to a small section of tbe tunnel, of boiler plate with double walls all around. Commence with one of these at the shore end, by sinking it deep enough into the river bed to be water tight at the bottom. This I would do by the pneumatic method used in sinking the pier foundations for the bridge across the Rhine near Strasbourg, which consists in forcing air into a bottom chamber or chambers, thus forcing the water out (as in a diving bell) and then having men at work in this chamber digging away under the walls, the earth so dug away being lifted out through a vertical pipe coming down the middle of this chamber from above the water level and standing with its end in a sort of well-hole of water in the bottom. The earth is pushed into this well-hole under the bottom edge of the tube. This method insures a uniform, steady, and quiet settlement, with the whole operation perfectly under control, none of which advantages are attainable by the other pneumatic method of *exhausting* the air from the chamber to be sunk and thus forcing it down by atmospheric pressure only. In the method chosen, the compressed air could be maintained in the bottom chambers after the sinking of the cofferdam, and would be very effectual in preventing the water from getting under. Now pump out the water inside the cofferdam. Build the tunnel inside, in an open cut, as a sewer is built in a street: cover everything up again. In the mean while the second cofferdam has been brought around in front, in the line of the tunnel, a water-tight connection made between it and the first one, the water pumped out of it, and the tunnel can proceed into and within its safe precincts. As soon as it is well inside, lift the first one out of the mud (the rise of the tide could be used for this purpose, if it would not rise of itself as soon as the load, required to counteract the upward force of the compressed air underneath, was removed) bring it around in front of number two, and so on across the river. Various modifications and details have of course occurred to me, but these would be premature and uninteresting at present, as the above gives the general outline of the proposed plan. After you have thus reached Brooklyn, the same two cofferdams might suffice to carry you hand over hand over to Jersey City. CIVIL ENGINEER.

Boston, March 12, 1867.

[We do not see the necessity, under the above plan, of keeping the men at work in compressed air, or of using peculiar and awkward methods for raising the earth. If the cofferdam be settled water tight upon the bottom, the working chamber may be emptied through a valve which will exclude water, and free access may be had to it through a well: or, as a simpler method, the water may be forced out at the top of the well itself. We are inclined to think, however, that a still easier way to tighten the cofferdam would be to furnish the lower edge of its sides all around with an unbroken series of vertically sliding plates, tongued and grooved together, or in some other way made to work nearly water tight, and driven down into the mud like spades, each as far as needed, by a moderate force from above. The cofferdam would then be pumped dry with very slight waste of labor.—The problems connected with steel bridges may be studied at the Paris Exposition with some advantage from an elegant structure of the kind—the first in France—which has been put up at one of the approaches of the Champ de Mars. We have no data of its structure, save that its span is 82 feet and width 69 feet, and that it has been tested with a load of 262 tuns, and with loads of 6 tuns upon a single wheel.—EDS.

Gage for Laying out Tank Staves.

MESSRS. EDITORS:—I often see joiners making water tanks and others work, of a conical form, seemingly without rule, other than a half scribe and a half guess rule, which compels them to work the staves to a like width, thus wasting time and material, or else fit each stave for a certain place. The above is my apology for offering for your consideration the following simple and correct method of laying out the work, which might benefit some of your readers.

Make a gage of a thin piece of board (a shingle will do) by striking part of a circle on it of a size desired for the largest end of the tank, also another part of a circle of the size of the small end of the tank, struck from the same center. Draw radial lines across the segment thus marked out, say about one eighth of an inch apart. Cut the shingle to the circular lines and nail a piece of lath to it, the straight edge of it to one of the outside radial lines, and the gage is finished, which will lay out correctly any stave be it wide or narrow.

Suppose a plank will work to a certain width; place the gage upon that end and mark from the edge of the lath to any radial line which fits the width of the plank, marking by the line which reaches the outer circle of the gage. Then slide the gage to the other end of the plank, or the distance corresponding to the hight of the tank, and mark again to the same radial line on the inner cirle. Then line from these two end marks. C. GOODWIN.

Beardstown, Ill.

Consumption of Coal.

MESSRS. EDITORS:—On page 22 of this volume, in a short article on steam I stated that the theoretical minimum amount of consumption of coal in a steam boiler is 4 lbs. per hour, per horse-power of the engine, and that this is never reached on a small scale. This statement is objected to by a correspondent (page 108) who mentions that the consumption of coal in the *Great Eastern* is said to be 4 lbs. per horse-power per hour, locomotives, 2½ lbs., Cornish engines, 2 lbs., and that Bourne even gives 1·74 lbs. for locomotives.

My statement of the 4 lbs was not made without the

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knowledge of the last-mentioned estimates. The article being writen for instruction and not for debate about conflicting and erroneous statements, I was silent about them, considering these very low estimates as entirely unreliable, and, in fact, as false statements: the reason will be clear from the following.

The whole question of course depends on the amount of water evaporated from a given quantity of fuel. It is demonstrated that one pound of coal, by the very best method of combustion, will produce 13,500 units of heat, that is, it will heat 13,500 lbs. of water one degree. Starting now with water of about 60° we have to add 150° to reach the boiling point, and adding to this the 1,000° units latent heat required to change the water into steam gives a consumption of heat of 1,150°: this divided among the 13,500 lbs. water gives nearly 12 lbs. water changed into steam by one lb. of coal: thus 3 lbs. of coal will convert 36 lbs. of water into steam. On page 22 I demonstrated that the evaporation of 9 ounces of water per minute produced a certain power which it has been agreed to call a horse-power: this is the same as $9 \times 60 = 540$ ounces or 34 lbs. water per hour, corresponding very nearly with the above amount of water evaporated by 3 lbs. of coal. This is the correct theoretical amount for low pressure steam. For high pressure there is some advantage, as is known, but not to such a degree as to account for the very low estimates spoken of above. In practice it appears that never as much as 12 lbs. of water for every lb. of coal is evaporated: we may verify this by Bourne in his treatise on the steam engine. He states (page 81) that 112 lbs. of coal will evaporate from 11 to 18 cubic feet of water; the last number corresponding with the perform ance of the very best Cornish boilers: this gives with 1 lb. of coal from 6 to 10 lbs. of water.

Theoretically, the evaporation of 36 lbs. of water (a little more than half a cubic foot) in one hour should thus produce a horse-power: in practice, however, it is found that a cubic foot is required, and this has generally been adopted as the nearest to the results of experience: this brings the theoretical consumption of 3 lbs. of coal to 5 lbs. at least: I adopted 4 lbs. for the minimum reached. Prof. Silliman, who is very correct in collecting his data, states in the last edition of his Physics that in England 10 lbs. of bituminous coal per hour are estimated for every horse power; that in very carefully constructed boilers this effect is reached by 7 or 8 pounds, that in the Cornish boilers with large evaporating and heating surface, the most economical in existence, 5 lbs. are used, and finally that in the United States the anthracite averages 6·25 lbs. per horse-power per hour.

Tredgold, in his practical treatise on Railroads, states, page 82, that 124 lbs. of coal per day in practice, and 82 lbs as the lowest possible theoretical amount of coal per day for every horse-power, is the consumption for the "best locomotive engines likely ever to be invented."

Practical engineers and locomotive builders (for instance at Baldwin's Locomotive Works, in this city) will allagree when conversing with them on this matter, that practically estimating the amount of coal used per horse-power is very difficult, as it is subject to so manifold disturbing influences that the most conflicting results are continually arrived at; therefore, they never trouble themselves with such a calculation, notwithstanding there exists a rivalry on many lines between engineers to economise fuel. The consumption will in the first place depend on the quality of the coal, in which there is more difference than those who do not run engines dream of; then in drawing a railroad train it depends on the state of the weather, temperature, direction of wind, number of stoppages, but above all on the judgment of engineer and fireman, etc. On the Central Pennsylvania road from Philadelphia to Pittsburg, for instance, of two locomotives perfectly alike in all re spects, drawing loads also alike, one will use double the amount of coal used by the other, when running over the same distance with the same velocity. Sometimes the same locomotive will improve in this respect and burn less than before, sometimes the opposite takes place. P. H. Vander Weyde.

Philadelphia, Feb. 15, 1867.

An Appreciative Patron.

We wish we had space to publish all the complimentary letters we receive from our patrons; some commendatory of the paper and others of our Patent Agency. But if we should publish half the number we get, we should not have room for anything else, so we forbear inserting only an occasional one. Read the annexed.

Messrs. Munn & Co.—It gives me great pleasure to acknowledge the receipt of my Letters Patent. I particularly admire your ability in framing my specification and claims, which secure to me more than I expected when I applied for a patent. I would say to inventors or those about to apply for patents that if they place their inventions in your hands, they will be successful if there is any novelty in their invention. Omar J. Arnold.

Mt. Ida, Grant county Wis., March 12, 1867,

Kansan Ideas of Comfort.—A subscriber residing in Kansas, after having for years been tormented by the devastations of the gopher, repeatedly losing crops, fruit trees and shrubs, has at last invented a trap which he thinks is a perfect protection, and is happy in the prospect of enjoying peace and comfort in the future. "All I now ask," he says, "is a cabinet organ, a sewing machine, a stereoscope with views, some volumes of the Scientific American, and half a dozen gopher traps."

Mucilage Bottle Cap.—In our notice of this cap, in our last issue, page 212, we omitted to say that the cap is made from spring sheet brass ornamented by beading and is cheaper than any other in the market. We are satisfied from trial that it has no superior among the different kinds which have come under our observation.

[For the Scientific American.]

APPLICATION OF THE LEVER ESCAPEMENT.

by jules d. huguenin vuillemin.

Of all the escapements in use the lever is the one employed as giving the best satisfaction for pocket time-keepers. There are several ways of applying it, not only in the distribution of its degrees but in the adjustment of its different parts. A Swiss firm who have succeeded in giving excellent satisfaction with their watches, adopt the straight line lever escapement with two rollers, the advantages of which may be briefly stated.

By placing on a straight line the lever and the wheel, the teeth of the latter act more equally on the pallets than when put in any other position. This has been demonstrated by several authors, to whom I refer, desiring to be brief in things which have been fully and duly explained by others.

It seems at first immaterial whether or not the center of the balance be a little nearer or a little further from the center of the lever, or in other words, have a long or short fork. As the distance from the pin jewel to the center of the balance is proportionate to the length of the fork, the connection of the levers does not change, consequently the power and resistance remaining between both in the same condition the results are equivalent.

It must be taken into consideration that with a long fork the whole lever becomes heavier, not alone by the addition of weight in the length of the fork but also by the counterpoise with which the backward part of the fork must be charged for keeping its equilibrium. The inertness of the lever and the resistance to the motive power are therefore increased, and friction becomes more extended. For a long fork it is also necessary to employ a large roller. This large roller, by overcharging the center of the balance, makes it necessary to charge also its limbs and to employ a more powerful hairspring and finally a stronger motor or mainspring. As all the resistances of the escapement are increased the causes of wear and tear are also increased proportionately. This consideration shows that it is advantageous to keep the fork as short as possible, without, however, going to extremes.

The difference between the banking generally employed and the banking of the escapement with two roller, one specially for the banking, will now be explained. The roller used generally bears the pin jewel which receives the impulsion from the split of the fork. It is only behind the split of the fork that the banking heel comes, which must be sharp or replaced by a vertical pin to approach as near as possible the center of the roller. As the banking action acts against the edge of the roller, which is somewhat outside of the pin jewel, the heel can not approach the center, and as only a little room can be made, the consequence is that when the watch receives a shock, the heel touches the edge of the roller, which interferes with the vibrations of the balance, and this may also often occur when the watch is hanging.

When the escapement is made with two rollers, the bank ing roller is behind the pin jewel. The banking pin is longer than the whole split of the ordinary fork, and when in motion describes a larger circle, and consequently approaches much nearer the center of the small roller, and by giving room, which can easily be done, between the small roller and the end of the banking pin, the motion of the watch can never be interfered with, either by receiving a shock or when hanging. This escapement will be found easy to make and to repair when it is by accident out of order.

Various Recipes.

To Clean a Soldering Copper.—Rub it when hot on a brick with rosin and solder.

Arsenical Soap.—This preparation is used to preserve the skins of birds and other small animals. Take of carbonate of potash 12 oz.; white arsenic, white soap, and slacked lime, of each 4 oz.; powdered camphor, ¼ oz. Add sufficient water to form a paste.

Liquid Blacking.—I. Take ivory black 5 oz., molasses 4 oz., sweet oil ¼ oz.; triturate until the oil is perfectly killed, then stir in gradually vinegar and beer bottom of each ¼ of a pint and continue the agitation until the mixture is complete.

II. Take ivory black 1 lb., molasses ¼ lb,, sperm oil 2 oz., beer and vinegar each 1 pint; proceed as before.

French Polish for Boots And Shoes.—Logwood chips, half a pound; glue, quarter of a pound; indigo pounded very fine, quarter of an ounce. Boil these ingredients in two pints of vinegar and one of water during ten minutes after ebulli tion, then strain the liquid. When cold it is fit for use. To apply the French polish, the dirt must be cleaned from the boots or shoes; when these are quite dry, the liquid polish is put on with a bit of sponge.

Solder for Brass Instruments.—An alloy of 78.26 parts o brass, 17.41 of zinc, and 4.33 of silver, with the addition of a little chloride of potassium to the borax, is recommended by Mr. Appelbaum as the best solder for brass tubes which have to undergo much hammering or drawing after joining.

Water-Proof Composition for Leather.—Melt together 1 lb. tallow, ½ ounce neatsfoot oil, 1 oz. of rosin, ½ ounce lampblack and a tablespoon full of boiled linseed oil. Should be rubbed in repeatedly, the boots or other articles to be warmed. It is said to be perfectly water-proof and not injurious to the leather.

The Chicago Tunnel was opened to the waters of the lake on the 7th inst., by four men who walked through it from the shore and ascended through the lake shaft; the ice having rendered it impossible to get at the flood gates by means of a steamer. The men, after opening the gates, were obliged to wait there until a boat could be got within their reach.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Churn Dasher.—Anson A. Avery, Cardiff, N. Y.—This invention relates to an improvement in churn dashers, and consists in forming a dasher with a series of bars fluted and slotted in such manner that the air is caught under and forced through them with the cream so as to thoroughly intermingle in their passage through the bars and thus produce the effect of an atmospheric churn upon the cream, bringing the butter quickly.

Portable Box for Protecting Trees.—Henry A. Graef, Brooklyn, N. Y —This invention relates to an improved mode of constructing boxes for proteeting young trees when planted out where they are exposed to injury from the destruction of the bark by cattle, etc., and consists in forming them of upright wooden slats or metal strips which are attached to wooden or sheet iron hoops or bands.

Hay Loader.—E. C. Green, Plainfield, Ind.—The object of this invention is to load hay or corn fodder upon wagons, either from the shock or the windrow in the field.

Spring Bed.—David Manuel, Boston, Mass.—This inventions relates to improvements in the construction and arrangement of a spring bed and consists in a new mode of forming the springs and connecting them to the slats and bedstead, which secures an easy and gentle pliability and elastic power in the springs.

Ice Cream Freezer.—H. B. Masser, Sunbury, Pa.—This invention relates to an improvement in ice cream freezers, and consists in arranging a rotary freezing can in combination with a rotary beater in such manner that the can and the beater shall each have a distinct and separate motion independent of the other, or a joint motion when desired; and also an improved mode of packing the side of the beater.

Clothes Tongs.—Benedict Ott, La Crosse, Wis.—The object of this invention is to provide a convenient utensil for the use of women in washing clothes whereby they can lift and handle clothes when hot in a boiler or tub without exposing themselves to being scalded, or when in excessively cold water for rinsing, etc., without contact of the hands to chill them.

Atmospheric Fountain.—John Ross, Greenville, Mich.—This invention consists in improvements in a parlor atmospheric fountain, rendering it more convenient, cleanly and ornamental, by the application of a pump for elevating the water to the upper chamber and a novel arrangement of pipes conveying air and water to the different chambers.

Device for setting up Barrels, Casks, etc.—C. B. Hutchinson, Auburn, N. Y.—This invention relates to a new and improved device for setting up barrels, casks, etc., whereby the staves previously chamfered and crozed may be set up around their own head, the use of truss and hoops avoided or rendered unnecessary, the barrels or casks all made of an uniform size, and the work performed expeditiously and in a perfect manner.

Gun Wormer.—Henry C. Bascom, La Crosse, Wis.—This invention relates to an improvement in gun wormers or a screw in a ram rod for extricating bullets or a wad from the barrel of a gun and consists in so arranging it in connection with a thimble or case fastened on the end of the ramrod that it may be drawn within the case or portruded therefrom as required, by a screw or slide movement.

Cook Stove.—Seymour Raymond, Middletown, Pa.—This invention relates to an improvement in the tops of cook stoves and consists in making the division plates for the pot holes in such manner that they may be reversed in their position or turned up side down for the purpose of equalizing the action of the heat and preventing them from becoming warped and ruined by the constant action of the fire on one side only to which they are exposed when the plates are not reversible as commonly constructed.

Pad Plates for Harness Saddles.—Palmer Shaw and Edward S. Dawson, Syracuse, N. Y.—This invention has for its object to furnish an improved pad plate for harness saddles, which shall be light, strong and easily and cheaply constructed.

Method of Applying Hoops to Barrels.—Daniel and Edwin Perry, Pawtucket, R. I.—This invention consists in constructing concave bands or hoops, and applying them to barrels, tubs, pails and butter molds by cutting two parallel channels or grooves on the exterior surface of the barrels or tubs at the same distance apart that the hoop is designed to be wide.

Metallic Gage Head and Fastener.—Peter Lawyer, Richmondville, N. Y.—This invention has for its object to furnish an improved gage head simple in construction, easily, quickly, and accurately adjusted, and which when its face has been once made at right angles to the rod will always remain so.

Hernia Truss.—William Pomeroy, New York City.—This invention has for its object to furnish an improved truss so constructed and arranged as to give an upward and inward pressure, which may be shortened or lengthened to perfectly adjust the pad to the hernia; and which will not allow the movements of the body to interfere with the position of the pad over the hernia.

Screw Valve.—John Wilcox, Thompsonville, Conn.—This invention consists in constructing a valve, and in attaching it to its seat and operating it by a screw in such a manner as to adapt it to various purposes, whereby many difficulties which have hitherto been experienced in opening and closing appertures for the admission or discharge of air, gas, steam or liquid is overcome.

Machine for Making Carriage Bolt Blanks.—William Koplin, New castle, Pa.—This machine cuts off a suitable length of bar, grasps and points it, upsets it so as to form a square portion between the head and the end longer in diameter than the latter, and lastly swedges a raised head completing the bolt blank which is discharged by a hook which drags it from its bed and drops it to the ground.

Machine for Forming Eave Troughs and Conductor Pipes.—A. Calkkins and Wm. Tower, Almont, Mich.—This invention has for its object to furnish an improved machine by means of which the manufacture of eave troughs and conductor pipes may be greatly facilitated.

Axle Box Cover.—Richard McDowell, Lambertville, N. J.—The object of this invention is to provide a cover to axle boxes of railroad cars which can be easily removed and replaced for cleaning, lubricating and other purposes

Machine for Cultivating and Planting.—Isaac H. Chappell, Decatur, Ill.—This invention has for its object to furnish an improved machine that can be readily adjusted for use either as a cultivator, planter or seeder.

Cotton Bale Tie.—Daniel M. Sechler, Cincinnati, Ohio.—This tie consists of two loops around which the respective ends of the hoop are bent and replicated; the smaller loop is then passed through the larger at a certain point and being slipped back is retained at the narrow portion of the opening in the larger portion.

Churn.—John Megown, New London, Mo.—This invention consists principally in the construction of the churn, and in the combination and arrangement of the operating parts with each other and with the hinged lid so that the said operating parts may be removed from the churn by simply raising and turning back the lid.

Sight for Fire-arms.—Williston Conner, Rensselaerville, N. Y.—The object of this invention is to construct an accurate sight which can be quickly adjusted to any range and which may be removed below the line of range o a fire-arm to which it may be attached so as not to obstruct the use of the intervening sights. With a slight modification the same device may be used for adjusting telescopic sights on fire-arms.

Crystal Sirup.—H. C. Becker, New York City.—This invention relates to a new composition for making crystal sirup, which when added to sugar prevents graining and fermentation of the same, and which is also of great value when used for preserving fruit.

Saw Gummer.—James E. Emerson, Trenton, N. J.—This machine consists of a rotary cutter mounted in a frame which may be attached to the saw blade at will by means of thumb screws used both as clamps and pivots, and an adjustable handle by which the pressure may be always applied in the plane of resistance.

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SAW MILL.—O. A. Bassett, Norwich, N. Y.—This invention has for its object to furnish an improved friction feed for circular saws and other machines in which it is necessary to change the direction of the feed while the machine is at work.

BRUSH.—John Brown Alden, Worcester, Mass.—This invention consists in making the body or stock of the brush in two pieces which are pivoted together, whereby the brush can be reversed or changed end for end.

FAUCET.—John Wilcox, Thompsonville, Conn.—This invention consists in constructing a faucet in such a manner that the liability to leak from any part is greatly lessened, the faucet valve being double packed and the packing of all the joints as well as that of the valve being secured in recesses provided for the purpose.

TRAVELING BAG.—Charles F. Blakslee, Brooklyn, N. Y.—This invention consists in perforating the frame in such a manner that the cloth or leather can be fastened directly to it without the use of any other piece or pieces of iron.

BURGLAR ALARM.—C. Waterman, New York City.—This invention relates to a new and improved burglar alarm for doors and windows, and it consists in a new and improved means employed for locking the bell hammer and liberating the same, whereby the alarm, when a door or window to which the invention is applied is partially opened or opened sufficiently far to operate the alarm; cannot be stopped by suddenly closing the door or window.

APPARATUS FOR DRAWING IRON FROM FURNACES.—David N. Williams, Chicago, Ill.—This invention relates to a new and improved apparatus for facilitating the drawing of hot iron from furnaces, and has for its object the arranging or adapting of the several parts in such a manner that the tongs may be adjusted to draw the hot iron from the furnace in any required direction in a right line, thereby greatly facilitating the work, rendering it less laborious, and economizing in time.

COMPENSATING STAY OR BRACE FOR THE SPRINGS OF WHEEL VEHICLES.—Samuel Jackson, Newark, N. J.—The object of this invention is to apply a stay or brace to a vehicle spring, in such a manner that it will work or move to conform to the yielding movement of the spring, and to serve as an efficient brace to the latter at all points or in whatever position the spring may be in.

CORN PLANTER.—Curran Henkle, Washington Courthouse, Ohio.—This invention relates to a new and improved means for distributing or discharging the seed from the seed box or hopper of the machine, and depositing the same in the furrow, whereby the planting or dropping of the seed is placed under the complete control of the operator, and a very simple and efficient device for the purpose specified obtained.

BURGLAR-PROOF SAFE AND VAULT.—E. M. Hendrickson, Brooklyn, N. Y.—This invention relates to an improvement on that class of burglar-proof safes and vaults in which chilled cast-iron walls are employed in order to prevent an entrance being effected by means of drilling.

HOP FRAME.—Jacob B. Van Dewerker, Cobleskill, N. Y.—This invention relates to a new and improved frame for training hops, and has for its object simplicity and economy in construction, and facility in training the vines thereon, and in removing the bearing portion of the vines when in a proper condition to gather or harvest.

PUMP.—Hiram Tyler, Gaines, N. Y.—This invention relates to a new and improved double-acting pump, and it consists in a novel arrangement of valves and water passages, and in an improved construction of the valves, whereby the pump is rendered very efficient in its operation, the parts not liable to get out of repair or become deranged by use, and the pump capable of being used either submerged or above the level of the water to be raised or forced up.

WINDOW FASTENING.—J. D. Smith, Naugatuck, Conn.—This invention relates to an improvement in that class of window fastenings, which are composed of a bolt provided with a spiral spring, the bolt working in metallic thimbles fitted in the side of the sash.

HEAD BLOCK FOR SAW MILLS.—William Carlton, Dunkirk, N. Y.—This invention relates to a new and improved head block for saw mills, and it consists in the means employed for adjusting the knees or standards against which the log to be sawed bears, and by which means the log is set to the saw.

FASTENING FOR CORSETS.—James Bowers, New York City.—This invention relates to a new and improved fastening for that kind of stays or corsets which are composed of two parts, connected by a lacing at the rear part, and by a fastening at the front, which will admit of the front ends of the two parts being readily connected or disconnected.

HEAD BLOCK FOR SAW MILLS.—George Burket and Samuel M. Gaskill, Bluffton, Ohio.—This invention relates to a new and improved head block for saw mills, and it consists in an improved mechanism for setting the log to the saw, and also in an improved reversing mechanism for gigging back the carriage.

SEWING MACHINE.—Walter Bennett, Hunt's Hollow, N. Y.—This invention relates to a new and useful improvement in that class of sewing machines in which a reciprocating shuttle is used, and the invention consists in the means employed for guiding the shuttle carrier or retaining it in proper position while being operated.

DISTILLATION OF BROMINE AND IODINE.—David Alter, Freeport, Pa.—The nature of this invention relates to an improvement in the distillation of bromine and iodine by the use of an alkali to absorb the fumes of bromine and hydro-bromic acid, which would otherwise escape during the production and distillation of the above-named substances.

MILK CAN.—John L. Finch, Warwick, N. Y.—This invention consists principally in the combination of an iron outer case, with a milk can constructed in the ordinary manner, except that the narrow hoops usually put around milk cans are omitted.

HAY RAKE.—John I. Munroe, Burlington, Mass.—This invention consists in applying elastic tips to the rigid teeth of an independent toothed hay rake, to enable them to pass over obstructions without gaping and scattering the hay already collected, and the combination of a divider with the frame of the rake, which, when the teeth are raised to discharge the collected hay, may at the same time drop down into the spread hay, and separate or divide it, so that when the rake teeth descend, and the divider rises, the said teeth may drop down into the space thus cleared, and no hay be left scattered or trailing behind the rake.

HANGING RECIPROCATING SAWS.—Josephine Stewart, Owasso, Mich.—This invention consists in so arranging the different portions of the machine that the saw may be forced back during its upward stroke, to avoid unnecessary friction, and to permit the escape of the saw dust. When it descends, the saw is drawn forward against the timber to be sawn, combined vertical and horizontal motion is thus imparted to the saw.

BENDING MACHINE.—E. D. Gird and W. K. Gird, Cedar Lake, N. Y.—This invention relates to a machine for bending wood, iron, or other material, to any desired shape or form.

WAGON BRAKE.—R. O. Codding and G. W. Pringle, Coddington, Ohio.—This invention relates to a brake which is applied to the front wheels of a wagon in descending a hill, to relieve the team from the pressure of the load.

LOCK.—William J. Hare, New York City.—This invention relates to a lock, the principal working parts of which consist of two spring jaws, which catch into a neck on the stud or nose, secured to the door, lid, or other part, to be locked, and which are forced apart by the action of a key on one or more wedges, which enter below the spring jaws, and compel them to release the stud or nose in such a manner that a simple and secure lock is obtained, which cannot be readily picked or blown open, and which can be applied with advantage to doors of any description, or to trunks or other articles of a similar description.

MACHINE FOR CUTTING SHINGLES AND BARREL HEADS.—S. E. Anthony, Stillwater, N. Y.—This invention relates to an improved machine for cutting shingles and barrel heads, and of that class in which circular saws are employed. The invention consists in the employment or use of an endless bolt carriage, constructed in such a manner that it may work over pulleys, and using in connection therewith one or more circular saws and beds, and an automatic dogging device, all being arranged to operate in the most efficient manner.

BRICK MACHINE.—Philip H. Kells, Adrian, Mich.—This invention relates to a mold wheel which is supported by carrier wheels; the clay is pressed into the molds by the blades of the pug mill, and a contracting throat, and is cut off, forming the upper surface of the brick by the passage of the mold under a cutter board. The brick is raised and discharged from the mold by a follower moved from below by the passage of its carrier wheel upon an inclined plane on the bed track.

KINDLING ARRANGEMENT FOR STOVES.—Harvey L. Byrd, Baltimore Md.—This invention consists in a basket which contains kindling; and hinged under the grate of the stove, so as when elevated, and the contents ignited, to start the fire in the coals chamber of the stove.

COMBINED RULER AND BLOTTING PAD.—Messrs. Walker & Sneeden of Newark, N. J., have patented a simple and convenient blotting paper holder and ruler combined, which will be very desirable for the counting house. The edges of a short and broad rule are grooved, the paper is cut just wide enough to cover the underside and the grooves, and a clamp of bent wire is slid on from each end, resting, and holding the edges of the blotting paper, in the grooves. This ruler may be freely used on the ledger, or on paper where successive or cross rulings are to be made, without the necessity of looking out for the fresh ink.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

64.—TREATING BENZOLE AND OTHER HYDROCARBON LIQUIDS, ETC.—John Johnson, Wilmington, Ill. Jan. 10, 1867.

138.—CONSTRUCTION OF STEAM GENERATOR.—George Gould, Troy, N. Y. Jan. 19, 1867.

182.—FIRE-ARM.—Sylvester H. Roper, Roxbury, Mass. Jan. 24. 1867.

217.—VOLUTE SPRING.—Charles Morrill, New York City. Jan. 26, 1867.

219.—MACHINERY FOR ROVING AND SPINNING WOOL AND OTHER FIBROUS MATERIALS.—Edwin Allen and Henry T. Potter, Norwich, Conn. January 26, 1867.

341.—BENCH VISE.—John S. Hoar, Mass. Feb. 6, 1867.

394.—PROCESS FOR PREPARING RAW HIDE FOR THE MANUFACTURE OF VARIOUS ARTICLES.—William H. Towers, New York City. Feb. 12, 1867.

71.—MAKING PHOTOGRAPHIC TRANSFERS.—Arthur G. Morvan, South Bergen, N. J. Jan. 11, 1867.

93.—LOOM FOR KNITTING.—Augustus C. Carey and Hugh K. Moore, Malden, Mass. Jan. 14, 1867.

99.—PIPE MOLDING AND CASTING APPARATUS AND BLACKWASHING THE MOLDS.—George Ross, Newport, Ky. Jan. 14, 1867.

121.—TINTING OR COLORING THE SURFACE OF PAPER OR OTHER MATERIALS OR FABRICS.—George Streat, New York City. Jan. 17, 1867.

175.—COTTON-BALE TIE.—John Lee, Blakely, Ga. Jan. 23, 1867.

185.—MACHINERY FOR BLOCKING HATS.—William C. Griswold and Julius Sheldon, New York City. Jan. 24, 1867.

199.—SPINNING AND TWISTING MACHINERY.—George Chatterton, Providence, R. I. Jan. 25, 1867.

260.—MACHINE FOR MANUFACTURING EYELETS.—William R. Landfear, Hartford, Ct. Jan. 30, 1867.

3,403.—PREVENTING ROT IN POTATOES AND GRAPES, ETC.—John F. Bennett, Pittsburgh, Pa. Dec. 28, 1866,

55.—PNEUMATIC APPARATUS FOR THE TREATMENT OF DISEASES IN AN ATTENUATED ATMOSPHERE.—George Hadfield, Cincinnati, Ohio. Jan. 8, 1867.

100.—ROTARY ENGINE.—Truman Merriam and James Cushing, Waterloo, Wis. Jan. 14, 1867.

188.—COMBINED TACK DRIVER AND CARPET STRETCHER.—Thomas Jebb, Buffalo, N. Y. Jan. 24, 1867.

202.—HAMMER.—Joseph A. Veazie, Boston, Mass. Jan. 25, 1867.

212.—TELEGRAPH CONDUCTOR AND CABLE.—John M. Batchelder, Cambridge, Mass. Jan. 26, 1867.

214.—WATER CLOSET.—David Lichtenstadt, New York City. Jan. 25, 1867.

255.—GAS REGULATOR.—Joseph S. Wood, John J. Carberry, John Baker, Jr., and Oscar D. McClellan, all of Philadelphia, Pa. Jan. 30, 1867.

269.—MACHINE FOR CUTTING SCREWS.—Henry Brown, New Haven, Ct. Jan. 31, 1867.

285.—OBTAINING METALS FROM THEIR ORES.—John Wyckoff, Brooklyn, N. Y. Feb. 1, 1867.

311.—BALE TIE.—Charles W. Walley, New Orleans, La. Feb. 4, 1867.

323.—MAKING FOIL OF LEAD COATED WITH TIN.—William W. Huse, New York City, Feb. 5, 1867.

NEW PUBLICATIONS.

THE MECHANICIAN AND CONSTRUCTOR, for Engineers, Comprising Forging, Planing, Lining, Shaping, Slotting, Turning, Screw Cutting, etc., by Cameron Knight. London: E. & F. N. Spon.

This is a serial publication, large quarto, sixteen pages of letter press, and four of fine plates in each number. It is issued monthly, to be completed in about twenty-four numbers, at $1 each. From the two specimen numbers before us we conceive a very favorable idea of its merits and purposes. Unlike many publications ostensibly designed for the instruction of the mechanic, it does not assume that he is already a mathematician, or even a thorough workman, but begins *ab initio*, furnishing valuable information in its first chapters to the workman as well as to the apprentice and beginner. No detail, in the manipulation of the metals used in constructing machinery appears to be regarded as too simple for the author's attention, and while describing and illustrating the proces es, he gives much valuable advice, valuable even to the experienced. The work is really excellent, and will prove valuable to every machinist and practical engineer. It is got up in superior style. For sale by John Wiley & Son, No. 535 Broadway, New York City.

THE AMERICAN CONFLICT. By Horace Greeley. Hartford, Conn.: O. D. Case.

We are indebted to the publisher for the second volume of this elaborate work by Horace Greeley. The first volume, which treated of the political causes which led to the secession of the Southern States followed by armed resistance to the authority of the Federal Government, had a larger sale than any other work of the kind which has yet appeared from the press. The present volume, which contains 732 pages, embraces a complete review of the war from the surrender of Gen. Twiggs, at San Antonio, Texas, to the final capitulation of the trans-Mississippi forces under command of Kirby Smith. In treating of the sanguinary events of the war, the author has employed his acknowledged resources in grouping together the tragic movements of armies and navies with great effect.

GUIDE MAPS AND HAND BOOKS

Of Iowa, Minnesota, and other western States and Territories, are published by Blanchard & Cra n, Chicago: presenting their agricultural, commercial and manufacturing resources, physical geography, geology, mineralogy, climate, insitutions, and statistics which are very valuable and useful to all who take an interest in the progress of our country.

EXTENSION NOTICES.

Hamilton L. Smith, of Gambier, Ohio, having petitioned for the extension of a patent granted to him the 7th day of June, 1853, for an improvement in paper files, for seven years from the expiration of said patent, which takes place on the 7th day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 20th day of May next.

James Rees and Robert Crichton, executors of Henry Carter, deceased, and James Rees, of Pittsburgh, Penn., having petitioned for the extension of a patent granted to the said Henry Carter and James Rees the 22d day of November, 1853, and antedated June 3d, 1853, for an improvement in nut machines, for seven years from the expiration of said patent, which takes place on the third day of June, 1867, it is ordered that the said petition be heard at the Patent office on Monday the 20th day of May next.

William S. Hyde, of Townsend, Ohio, having petitioned for the extension of a patent granted to him the 21st day of June, 1853, for an improvement in cultivator plows, for seven years from the expiration of said patent, which takes place on the 21st day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 3d day of June next.

Ralph J. Falconer, of Washington, D. C., having petitioned for the extension of a patent granted to him the 7th day of June, 1853, for an improvement in Hose Coupling, for seven years from the expiration of said patent, which takes place on the 7th day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of May next.

Giles F. Filley, of St. Louis, Mo., having petitioned for the extension of a patent granted to him the 14th day of June, 1853, for an improvement in cooking stoves, for seven years from the expiration of said patent, which takes place on the 14th day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of May next.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

M. C., of Ga., says that he applied in 1859 a method of discharging bilge water from leaky ships by means of an outward projecting pipe through the bottom of the vessel. It was applied to a steamer plying between Savannah and Florida and proved very efficient while the vessel was in motion. We do not exactly know when this device was first employed, but have the impression that it dated before 1859. See page 185.

R. H. S., of Mass.—Globe valves of composition are of excellent form and material to conduct heat, and if connected with the water space of the boiler by a short pipe will certainly get hot. Even if the heat is no more than that of boiling water—212°—it is too great for the bare hand. Cover the hand wheel with woolen lagging, or attach a wooden cross for handles to the wheel. . . . Equal quantities of tallow and lard, not salted, is better than tallow alone to mix with white lead for covering the polished parts of machinery. The tallow makes the paint too hard to be readily removed. Mix until the paint is of proper consistency to work with the brush.

L. M., of ——.—You will see in our last issue, No. 13, that we have referred to the subject of centrifugal motion as applied to belts. We think you are wrong in attributing centrifugal force only to bodies revolving rapidly. We intend to refer to this matter again.

A. S., of N. B.—Your claim for the largest cylinder engines for New York city up to 1866 is correct. England has built a larger one, but not for marine, but for pumping purposes.

A. S. Y. R., of N. Y.—In speaking of a bow rudder of the *Dunderberg* we used the word "bow" to designate "forward." The rudder is forward of the propeller, over the shaft, and may be called an "equipoise" or "ballanced" rudder.

J. H. H., of Wis.—The cracking of the water-back plate of your range is undoubtedly due to your improved draft, and consequently increased heat. The water evaporates into steam faster than it is supplied allowing the plates to burn. Make your space between the plates larger or use thicker and more strongly braced plates. Your suggestion of making ribs on the plates may be a good one. We cannot be more definite unless we know all the facts.

A. V. V., of N. Y.—We cannot give you the size of flues used in the boilers of ocean steamers unless we enumerate half the ocean steamers in existence. Some use tubes, some cylindrical, oval, and rectangular tubes, varying with the style of boiler.

H. W. S., of Me.—Mix your powdered plumbago with tallow or lard, and apply it as a paste to the parts where the friction is excessive.

G. B. S., of N. Y.—The difference in the amount of water flowing through one 4-inch pipe and four 1-inch pipes, head and pressure being equal, depends upon the areas of the pipes and the relative friction on their inside surfaces. As one only of these data is necessary to show you that they are not analogous, we state the area of the 4-inch pipe to be 12.57 inches while that of the 1-inch pipes is only 3·14 inches.

H. B., of Ill.—Turbine wheels work successfully under a less head than three feet. Water power, except in some very peculiar cases, is cheaper than steam power. . . . We cannot understand how electricity could be generated in a pneumatic tube to interfere with the action of the machinery. . . . No objection we can conceive of exists which may not be overcome, against the use of lag screws to secure rails to sleepers. We do not, however, remember any case where it has been tested.

T. A., of O.—Printing ink is composed of burnt linseed oil, resin and lampblack. Its quality depends greatly on the proper preparation of the oil, and the intimate mixture, by grinding, of the ingredients

M. D. K., of O.—We cannot give you reliable advice on coloring your gilding until we know the nature of the gilding process you employ.

L. J. G., of Md.—A ventilating register in the center of the ceiling is not a new device. The position of the ventilating register, whether at the top or the bottom of the room has been much discussed. There is no very authoritative opinion on either side of the question.

H. C. R., of N. H. wishes to know the amount of carbon in lead pipe compared with that of cast steel. Steel is a chemical compound of iron and carbon, but there is no corresponding compound of lead and carbon. Steel contains from one to one and a half per cent of carbon.

T. H. R., of N. J.—The adjutage for a fountain of water to secure the greatest flow has a length equal to two or three diameters and it has been found advantageous to slightly taper the tube outwards. This statement of the case is probably sufficient for all practical purposes and is all the information on the subject to be found in ordinary works on physics. We do not think the experimental data can be found for a precise answer to your question.

B. C., of N. H.—Will galvanized iron pipe injure well water? B. C. had excellent well water until it was brought into his house through a galvanized iron pipe. Now it is very hard and getting worse. He has another well of soft and excellent water 4 or 5 rods from the first one. We find no sufficient chemical reasons to connect the hardness with the galvanized pipe. The change will probably be found in the water before it enters the pipe and the hardness is due to sulphate of lime.

I. X. L., of N. Y.—"Do you know of any process by which sand can be mixed so as to become as hard as granite?" Yes. Mixed with an equal weight of soda ash and melt into glass.

C. H. C., of Ill., sends us an ingenious device for a perpetual motion based on the assumption that there is some substance which being interposed between a magnet and its armature will intercept or neutralize the magnetic force. When we find such a substance we will entertain the possibility of perpetual motion.

E. P., of Conn.—It is the contents of the egg shell, not the shell itself, which settle the coffee. If you carefully wash the shells from the adhering white of egg they will be useless. If the coffee is not ground too fine it settles well enough spontaneously. The practice of settling coffee with eggs and fish skins is very properly going out of fashion.

L. N. F., of Md.—If you are a tyro in electro-plating you will get useful information in the present number.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Jno. H. Glover, Lawrence, Mass., wishes to communicate with parties who can make pure zinc seamless tubes, 2 feet long, small.

F. A. Clark, Plantsville, Conn,, wishes to undertake the sale of a popular and desirable patented invention.

To Die Sinkers and Letter Cutters.—Wanted to contract for a large number of steel dies and letters. Parties prepared to do such work will please address Rollin Defrees, Washington, D. C.

E. N. Hays, Tuskegee, Ala., wishes to communicate with makers of padlocks.

H. Reed, Atlanta Ga., wishes to correspond with Tanners and those contemplating building on his improvements about patented.

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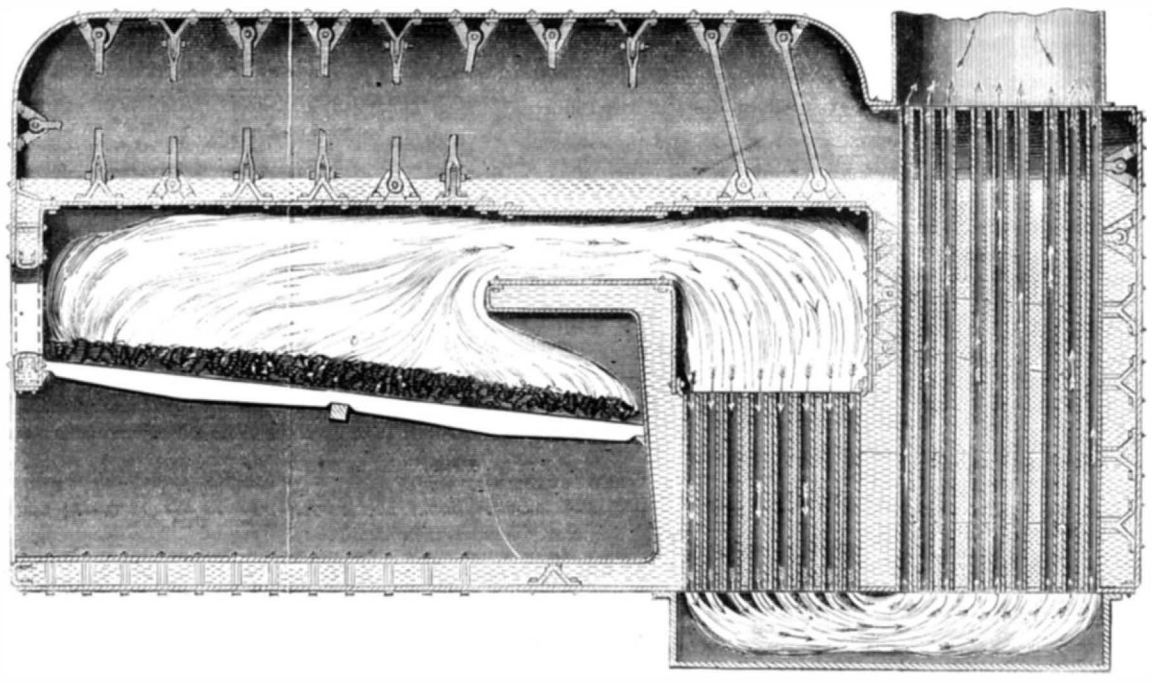
Gas Burning and Superheating Boiler.

The combustion of the gases evolved from fuel and the proper distribution of heat in a steam generator is a desideratum to obtain which many attempts have been made. The boiler, a longitudinal section of which is presented in the engraving, is intended to accomplish this result. As will be seen, the grate surface is very much larger in proportion to the water surface than in ordinary boilers. Projecting above the grate and covering a portion of it is a water leg acting as a bridge wall. Against this the flames impinge and partially envelope it; then the flame, smoke, and gases follow the direction of the arrows down through the vertical tubes to the lower combustion chamber into which through suitable apertures, governed by dampers, a proper quantity of atmospheric air is admitted to aid in the combustion of the gases, when the products pass upward through the back tubes to the smoke stack. These tubesmay be carried as high above the water level as desired, to superheat the steam. On the top of the boiler a dome of any required form and dimensions may be placed.



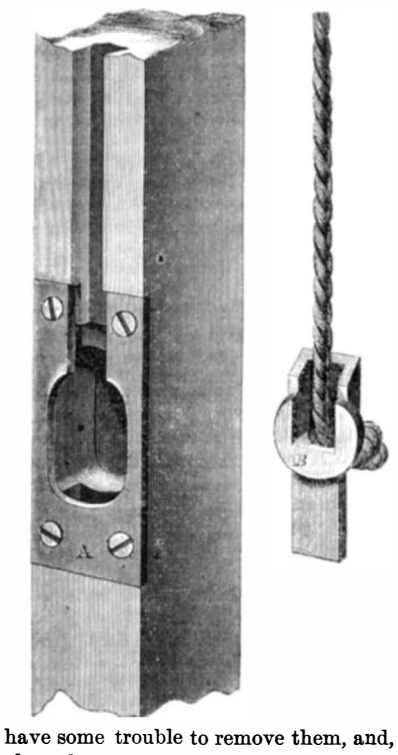
LESLIE'S STEAM BOILER.

To this boiler either the horizontal or vertical system of tubes or flues may be applied, or both may be combined in the same boiler. The addition of a combustion chamber for the purposes of consuming the gases, after they have left the furnace proper, is considered by the inventor superior to the device of burning them in the same chamber with the solid fuel. He claims that a good circulation of the water is insured by the peculiar construction of the boiler, and that the sediment will be deposited at the sides from whence it can be readily removed at the hand-holes. Those boilers of this style now in use, steam easily and rapidly, and the furnace can be adapted to all sorts of fuel, bituminous and antharcite coal, wood, shavings, sawdust, and coal dust. It is claimed that the water level will change very little with irregular feeding and that the boiler never primes.

It was patented July 5, 1865, through the Scientific American Patent Agency, by Hugh Leslie, proprietor of the Franklin Boiler Works, foot of Morgan street, Jersey City, N. J., where the boilers can be seen. He is now building one of fifty horse power. Communications relative to state rights or other particulars should be addressed as above.

SWIFT'S SASH-WEIGHT ATTACHMENT.

On the occasion of our annual house cleanings, those who have the sashes of their windows suspended by cords and



weights have some trouble to remove them, and, after cleaning, to replace them. It is a difficult matter to re-tie the knot so it will not slip but move clear.

We show in the engraving a very simple device for readily detaching the cord and weight from the sash and as easily attaching it. It consists of only two pieces of cast metal—iron will do, as they are always hidden—one, the plate, A, recessed in the sash frame and held by screws, and the other, B, made to slip into the plate, A. For better explanation we represent the two pieces separately. As will be seen the wood of the frame is morticed under the plate sufficiently to receive the cord catch, the tang of which passes under the lower part of the plate, and the piece is held in place by that and the circular boss, B, bearing against the walls of A at the upper part of the oval aperture. The cord passes through the piece, B, and is knotted in the usual manner, passing up through the longitudinal slot to the pulley in the window frame. The cord piece, B, can be readily detached by sliding it downward and pulling it outward.

This device was patented through the Scientific American Office March 5 1867, by Carlos Swift, of Mount Carroll, Ill. who will furnish any additional information.

Unique River Steamboat.

An eminent English marine engineer has given to the public a plan made by him at the request of Mr. H. B. Wilson, of New York, for a North River steamer of peculiar construction, designed to run thirty miles an hour and compete with the express trains of the Hudson River Railroad in point of time while in distancing them in comfort and cheapness. We presume, from the publication, that this plan was not accepted; but as a plan from high English authority, it is a curiosity. The hull was to be pointed at both ends, increasing by nearly straight lines to an extreme width of fifty feet at the center; length 450 feet, and draught 7 feet. Ten 19-feet paddle wheels, whirling at the rate of 72 revolutions a minute (!) were to be worked separately by as many pairs of 4 feet cylinders with 4 feet stroke, and so arranged that no wheel should work in the wake of another. A single immense boiler, 240 feet long, was to run lengthwise, on the bottom of the boat; its under part divided into 70 furnaces 3 feet wide. on each side, and the whole ventilated by ten chimneys. The main cabin would be above all the working parts. The description bears some resemblance to a paragraph in circulation here relative to a proposed Bessemer-steel boat for the North River.

What We Are Coming To.

The progress of railroad irresponsibility and barbarism on our city lines, causes the accounts of East Indian railway management to seem but a slight and natural advance—where there is any difference—upon that we are familiar with. An Indian journal says: "Whether the crowd be great or small, we have never known it considered necessary, so remarkable is the elasticity of the carriages, to afford extra accommodation. Last year, no less than seven or eight corpses, if we remember rightly, were taken from the carriages of this line (Calcutta & Delhi) alone—victims to a barbarous system of over-packing. Men and women are often so crushed in a third-class carriage as to be compelled to remain standing for the entire length of a journey, sometimes 400 or 500 miles, and at the hottest season of the year. Nowhere are the natives treated otherwise than as wild beasts. Tickets for distances under those paid for are constantly issued to the ignorant." Natives are arrested and dragged from the cars by drunken officials under the meanest pretexts, and when forced into higher-class cars for want of standing room in the others, are compelled to pay the extra charge for the accommodation of the company. Capt. Williams, an under secretary to the Government, states that the number of persons found dead in trains is very large.

Oiling the Sea.

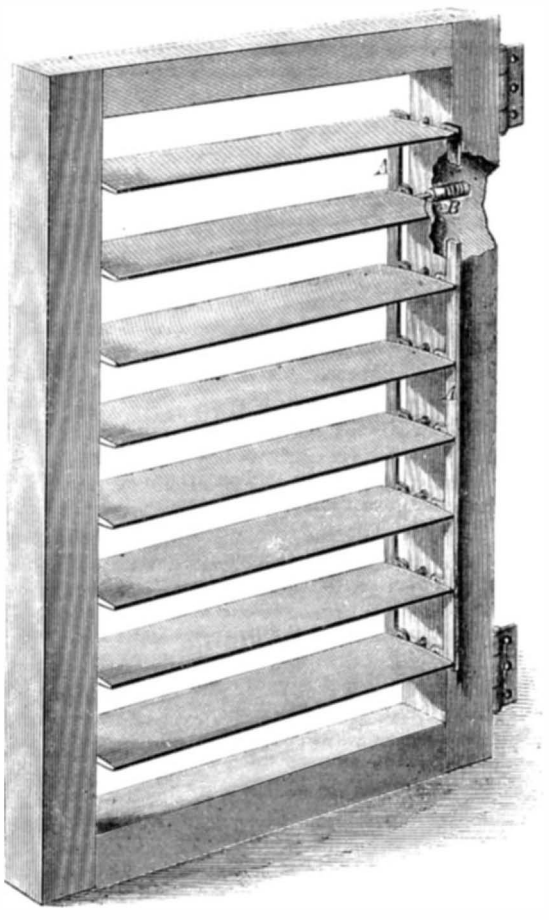
An experienced sea captain writes to the New York *Herald* that he has been at sea for twenty eight years, and master of a vessel for the last ten years, and during that time he saved the vessel under his command twice by "oiling the sea." He writes that "when the master of a ship cannot get out of a storm—that is, when a ship is disabled and he has to take the heft of the gale—if he has oil on board, start two or three gallons over the side of the ship. This will give the ship smooth water to the windward, and then the oil allowed to run drop by drop is all that is required, for as soon as the sea comes in contact with the oil it breaks, and the ship is in smooth water as long as the oil is allowed to run. In 1864, in the heaviest gale of wind I ever saw, I lost all my sails, then the rudder; and I know the vessel could not have ridden the sea for an hour if I had not had oil on board. Five gallons of oil lasted me fifty six hours, and this saved the vessel, cargo and lives on board. Let ships of heavy tunnage have two iron tanks of forty gallons each, one on each side, with faucet so arranged that the oil can be started at any time; small vessels, ten gallon tanks, and all ship's boats tanks of five gallons each, well filled, so that in case the ship founder or burn, the boats will have oil to smooth the sea in case of a gale. With these tanks of oil on board of ships and a good man for master—one who knows the laws of storms and handles his ship so as to get it out of the center of the storm, you will have no more foundering of good ships at sea, with the loss of many lives and millions of money."

HUTTON AND MEE'S IMPROVED BLIND ROD.

In the sultry summer, when with open windows and shut blinds we woo Æolus and deprecate the ardent gaze of Sol, it is pleasant to have the breeze, however faint, reach us, while we are certain the solar heat is shut out. For this we have the Venetian blind, so univer sally used in this country that it is no longer Venetian but American. Much of our comfort however, depends on the precise angle which the slats present to the horizon. But although our blinds are so arranged that we may move the slats in unison, in the ordinary blind, their permanence in the position desired depends simply on the friction of the pivots or of the guiding or adjusting rod.

By these means the slats may, or may not, retain their position, and constant wear reduces the friction so that the slats either fall of their own weight or are disturbed by a jar or abreath of wind. This contrivance is intended to secure rigidity of the slats in all positions.

It is simply the adaptation of metallic bars, A, placed at the side, instead of the center, and connected to each slat by a small pivot. Placed on both sides of the slats, they insure a more perfect and uniform movement of them. Being on the side they will not interfere with the raising or lowering of the window frame. One or more of the pivots of the slats come in contact with a spiral spring, B, seated in the



frame of the blind, which presses against it, and by its tension holds it in any position.

This device was patented through the Scientific American Patent Agency, January 1st, by Robert Hutton, assignor to himself and William Mee, of the same place, whom address for particulars, No. 1 and 3 South Seventh street, Williamsburgh, N. Y.

American Banking House in Paris.

Many of our citizens visiting Paris, at this season will find their interests and comforts greatly promoted by visiting the American Banking House of Messrs. Jas. W. Tucker & Co. No. 3 and 5 Rue Scribe. This firm have a Banking House; a commission department to purchase goods of every description; a steamer office for which they will act as agents for procuring passages; a reading room supplied with the leading journals of this country, also a post office and registry for the convenience of their customers.

Erratum.—In Mr. Baird's advertisement of "The Practical Draughtsman," the price of that costly work was erroneously printed $1. It should have been $10.

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VOL. XVI., No. 14....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, APRIL 6, 1867.

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CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK ROW, and not at No 39.

THE VALUE OF MECHANICAL SKILL IN THE ARTS.

Those who collect statistics of the world's material progress, and writers on cognate subjects, are fond of exhibiting and rehearsing the triumphs of machines over men—of mechanical contrivances over human skill. So much is attention attracted in this direction that we are apt to forget, in our admiration for the machine and its inventor, the skill of the mechanic whose delicacy and exactness of manipulation alone made it a success. We wonder that the machine can in its action so nearly approach the operations of the hand guided by the judgment, and almost venerate the intellect, which, by patient plodding or almost unexpected discovery, created it. But we do not so often wonder at the skill of hand, the correctness of eye, and the sensitiveness of touch by which the working mechanic elaborated the design of the inventor.

Mechanical skill is never a natural gift; it must be acquired by a long, persistent, and patient practice. There are those who much sooner get control of tools than others. Some can never, even by long practice, become close workmen; but generally the skill necessary to exact workmanship can be acquired, if the workman is not deterred by repeated failures and concentrates all his mental powers on the object sought. And the results are often surprising. The delicacy of touch in handling, forming, and adjusting the diminutive parts of a watch, for example, is almost miraculous. Lately, in reading a description of the Waltham, Mass., Watch Company's Works, we found a statement of the wonderful results of well-adjusted and delicate machinery which was almost incredible. It stated that perfect screws of steel, of such diminutive proportions that a microscope was necessary to see their form, are made by machinery. A pound weight required 300,000 of them, valued at from $3,000 to $3,500. But, we ask, how was the machinery built by which these screws were made? Simply by manual skill. In this same concern a workman had to make by hand the tool by which a tool was made, which latter tool became a portion of an automatic machine, and on this tool-creator he spent wearisome weeks of careful labor.

In fact all the astonishing results of automatic machinery are to be attributed to the hand skill of the workman. Is it any wonder that when we witness the performances of an intricate machine, as the card machine, for instance, we can hardly withhold the tribute of respect we pay to the exercise of human judgment? Human ingenuity, skill, brains, have been employed in its creation. Possibly a portion of that subtle essence called reason is in some way instilled into or imparted to the congeries of mechanical movements we call a machine. Indeed, are we not, as mechanics, in some sense machines? And yet for some purposes do we not create our equals—yes, even our superiors? But this is leading us into the regions of the metaphysical. We leave this to others, as not belonging to our province. We wish, mainly, to call the attention of mechanics to the importance of a practical knowledge of the skillful manipulation of tools, the necessity of patience in acquiring that skill, and the truth that the wonderful results of some of their productions, which may surprise even themselves, are simply and really the results of their own perfection in the use of tools, guided by their mechanical judgment.

It is true that a machine of steel, iron, brass, wood, and leather may produce results impossible to be imitated by hand, if rapidity, economy, and repeated exactness is required. Yet the machine which does this work is actually the product of manual skill as well as of inventive genius. And this manual skill—this education of the hand—is as valuable and necessary now as before machines, as technically considered, became common. In the age of chivalry, when the art of working metals was guarded as a secret, and the "cunning workmen" was the recipient of honors for his handiwork, everything like perfection in workmanship depended upon the judgment and handicraft of the workman. He had no machinery to reproduce copies of his work, but each successive result was from his own unaided and personal exertion. Such men are as valuable now as then. There is plenty of work to be done which no machine, however complex and ingenious, can compass; and the good workman is valuable, as is the inventor or the manager.

We witnessed an illustration of this fact, on a somewhat large scale, a few days ago, in a visit to the jewelry establishment of Carter, Howkins & Dodd, in Newark, N. J. The business of this establishment consists entirely in the manufacture of fine solid jewelry, gold, pearls, jet, coral, and enamel being the materials. They do not pretend to set gems, only to make gold jewelry. No article manufactured at this establishment is sham, filled, or of inferior material; and although the products of their work range from the plainest of plain gold rings to the most intricate chain work, hardly any portion of it is made by machinery. The main building is a perfect hive of industry; the workmen or workwomen sitting as closely together as the demands of their respective employments will serve, and from stage to stage producing most elaborately finished specimens of work.

Many people suppose that not only the sham jewelry known as "Attleboro jewelry"—from Attleboro, Mass., where the manufacture of false jewelry once was a principal resource of the town—but that good specimens also were made by machinery; "struck up" by means of dies acting on almost infinitesimally thin sheets, afterward to be "filled" with a baser metal to give them weight and solidity. This, however true it might have been a few years ago, is not now the case. Singularly enough as soon as gold went out of the community as a circulating medium of exchange, the people, satisfied before with imitations of its genuineness, demanded the reality, and now, we are told by Mr. Howkins, of the Newark firm, nothing suits the market but solid and genuine jewelry.

Some of the work, of course, must be done by machinery; as the rolling of the gold ingots into plates and the polishing of the finished work; but most of it is really and only hand work, depending for its exactness and nicety wholly upon the skill of the workman. Take the round jewelry so fashionable—pins, ear drops, studs, etc. They are first a disk of gold, cut from a sheet, to one edge of which is soldered a ring of similar sheet gold, making a flange. It is to be either chased or ornamented with enamel. The chasing is the work of the engraver, who must, by hand, cut every mark upon its surface; or if to be enameled, the pattern to receive the enamel is recessed into the gold by the graver, and then is sent to the filler who places the enamel in the recesses. This work, also is hand work. The enamel comes from Europe in masses resembling opaque glass, black, blue, or white, and is ground into a thin paste with water and laid into the spaces with a camel's hair brush by women. The article is then placed in a muffling furnace and subjected to a great heat which seats it firmly to the gold, the enamel acting, under heat, as a flux.

The settings of pearls, coral, and jet are also formed into shape by hand. and the material is set into these by hand. Even the watch chains we so much admire, the delicate threads of chains for suspending pin drops and handkerchief holders, and the network which forms the delicate bracelets sometimes seen, looking like ribbons of woven gold, are all formed, link, by link, by hand. These facts are hardly credible, yet it is so. Every link in a lady's watch chain or a gentleman's fob chain are separately formed, separately picked up and joined, and separately fused, welded, or soldered. The network of gold referred to as bracelets, so fine and close that light can barely be seen between their interstices, and so flexible as to equal the softest ribbons, are all made by hand, the links, not larger than grains of fine sand, being picked up, one by one, and interlocked with others until the work is completed. A cursory examination of one of these chains would convey the idea that they were woven as are ribbons of silk, and that the wire thread composing them was run through from end to end and across the fabric.

Machinery, however, cannot produce such work as we saw at this establishment. In this case as in many others the brain—intellect—is greater than brute or machine force. The human hand, guided by the human brain, is stronger, more subtile, and delicate than any machine made by man.

It is pleasant and somewhat gratifying to our pride as men to know that we still remain the "crown of all things," that we reign far above all of our creations; and for an exemplification of this grand fact we are indebted to our visit to the establishment of Carter, Howkins, & Dodd. In this connection it is only proper that we publicly tender our thanks to Mr. Wm. Howkins, one of the firm: for his suavity and kindness which enabled us to pass two hours so pleasantly in the inspection of the works, and gave us an opportunity to appreciate gentlemanly courtesy as well as to understand the superiority of men over machines.

THE TEREDO, OR SHIP WORM----IMPORTANT TRIAL.

A marine law case lately brought to trial before the Supreme Court, from the peculiar nature of a large part of the testimony, has attracted considerable public interest, particularly among ship owners and the marine insurance companies. The parties interested are well known shipping merchants of this city, and the action was brought for the recovery of heavy damages alleged to have been sustained by the plaintiffs in consequence of fraud and misrepresentation on the part of the defendant in the sale, in March, 1863, of a ship to the plaintiffs which two years after the purchase proved unseaworthy, her bottom having been badly eaten by worms. The point of interest in the case is the testimony elicited respecting the habits of the sea worm, and under what conditions this pest of the mercantile marine thrives. This evidence was introduced for the decision of the important question whether, provided the ship was as represented, the time elapsing between the sale and date when the vessel was docked for repairs was sufficient for the worm to have accomplished its work, the plaintiffs claiming that it was not, the defendants bringing the testimony of witnesses to show that the destruction could have been completed in a much shorter length of time while in the tropical and stormy seas.

The ship worm (*pholadidæ teredo*) called commonly by the latter and generic name, is an acephalous testaceous mollusk: the best known species, *teredo navalis*, attacks wood immersed in sea water, boring in the direction of the grain and swallowing the resulting dust. The borer of the teredo is admirably fitted by nature for the hard office it has to perform, being coated by a strong armor and provided with a mouth for piercing, like a leech. The rapidity and success of their boring varies with the different kinds of woods: fir and alder they eat with the greatest ease, but make much slower progress in oak, or the more bitter or solid woods.

The tropical waters are infested with these worms, and the warmer the climate the more dangerous and destructive they seem to be. From the tropical seas the teredo has been brought to the temperate waters of Europe and America, and has proved quite destructive, especially in Holland, where the dikes have several times given way, and great devastation has followed, as the result of its borings.

The worm at first is a very minute creature and leaves but a small opening on entering the wood: hence the interior of a plank may be almost entirely eaten away while preserving a fair and unbroken exterior. After entering the wood the worm increases rapidly in size, and though usually confining their operations to a single board, they never leave it until it has become completely honeycombed. Having once taken possession, they can only be removed by keeping the wood from the water for a length of time depending entirely upon the season, as they will immediately perish by frost, will live but a short time in hot dry weather, but are very tenacious of life in a damp state of the atmosphere.

By sailing into fresh water a ship may rid herself of these parasites in time, but the holes by which the worms entered are so minute that the salt water will be retained in the cells and fresh water will enter so slowly that the creatures will live and continue eating for some time after the vessel has left their natural element. Prevention, in this case, is certainly far better than cure, and if a new ship is properly sheathed, little danger need be apprehended from this source, as the copper acts not only as a preventive but also poisons the wood; the only possibility of exposure to their attacks being when, by careening, any portion of the vessel should fall below the water line, then on a long tack in the tropical seas, it is asserted, the teredo has been known to fasten itself to the vessel's side, and begin its destructive feast.

A WORD ABOUT ALMANACS.

With us of modern day, the almanac is valued as presenting in a convenient form the yearly calendar, a useful compilation of facts, or an annual of statistical knowledge of general import, and we can hardly realize the power exerted for ages by these productions of the old philomaths. To trace out the history of this class of popular literature would be an interesting but hopeless task, the origin and derivation of the name alike being lost in obscurity; the etymology of the word indicating an Arabic derivation and the very existence of the almanac being undoubtedly due to Mohammed on astrology. The offspring of ignorance and superstition, in its subsequent growth strangely combining truth and falsehood, assuming successively a religious, a merely astrological or a political character, its mischievous tendency at times so important as to be interdicted by royal decree, no other class of books reflects so well the tastes of the people for whose demand they were created.

Manuscript almanacs dating back to the fourteenth century are found in the old public libraries of Europe, carefully preserved marvels of fine workmanship and elaborate decoration, and it is not a little singular that the first page of each of the volumes now extant is invariably embellished with a portraiture of the human form, different portions of the body being divided off between the twelve celestial signs of the zodiac precisely as in the almanac of to day. The removal of this traditional cartoon has been attempted by the almanac wights at various times, but the result has always been pecuniary loss to the fastidious philomath, for the book wanting the "anatomy" was considered a dumb oracle and public opinion obstinately refused placing the least reliance upon its unsanctioned predictions.

Of late years it has become quite common for enterprising advertisers, particularly the venders of patent medicines, to make a medium of these periodicals, for gaining the public mind. But originality in this respect can not be pretended, for during the fifteenth and sixteenth centuries the physicians took the entire charge of these useful publications, and with a shrewd eye to business turned the power conferred upon them to a practical end, by nominating certain days for aperient and diuretic indulgence, together with others set aside for pharmaceutical abstinence; it is needless to add, that the former class held a striking predominance over the latter in annual comparison.

History preserves some memorable instances as showing what implicit reliance was placed upon the predictions of the crafty philomaths, even though repeatedly their wise announcements, owing to the unaccommodating nature of cir-

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cumstances, failed to prove true. In the year 1523, the almanacs foretold a series of incessant and destructive rains. As a consequence preparations for the anticipated deluge were made on an extended scale; but to the consternation of the augurers the season was one of unusual drouth: the cunning astrologers revised, with commendable zeal, their intricate calculations conveniently discovering that a vagrant cypher had mysteriously crept in, thereby anticipating the date by a thousand years. The political revolutions in England placed the almanac wights of that day in an unenviable position, human knowledge and sagacity could not foresee what turn affairs might take. Looked to for advice both by rulers and subjects, the philomaths could only meet the emergency by making their announcements of such a general character that the reigning power in either case could take no offense, and at the same time their reputation in this desperate game, be sustained.

The earliest literary productions on this continent were psalm books and almanacs and it was in this country that the latter first assumed anything approaching to a rational character. The publication of Poor Richard's almanac marks a new era from which dates a much needed reform. The reign of astrology succumbed in the march of progress, and gradually the display of pretentious prophecies which hitherto had rendered these works popular, gave way for information of more practical and genuine value.

While speaking thus disparagingly of astrology it is well to bear in mind just to what an extent we of to day are indebted to it. The supposed influence of the stars upon the destinies of man--analogous to the power exerted by the sun on the earth's vegetation and the seasons—led the astrological devotees to continued and careful observations on the motions of the heavenly bodies, and thus prepared the way for the perfected system of astronomy, a science worthy of the study of the philosopher.

The right of compiling almanacs, a hereditary monopoly enjoyed by certain privileged families for generations, has long since become common property, as witness the numberless publications, suited to every diversity of taste which supply the periodically returning demands made by the public at the opening of each new year.

GRAVEL AND CEMENT MINING.

We are indebted to Mr. H. L. Hopkins, a mill builder and inventor in California, for interesting information, illustrated with rich specimens, of both the original wealth and full half as wealthy waste, of the comparatively new class of workings known as "gravel" and "cement" claims. Their extent is yet unknown, but our informant believes, contrary to the general opinion, that it will prove to be general in all parts of the state.

These deposits are believed to be the beds of ancient rivers, lying now hundreds of feet below the surface of the ground. They are worked by tunnels and drifts at the bottom of the bed, simply washing out the lowest settlings of gold, and leaving the vast and valuable mass above, the bed rock which is very rich in gold, the abundant sulphurets, rich in gold which no satisfactory process can rescue as yet, numerous fragments of rich quartz, and a great deal of the less soluble cement or conglomerate, as "tailings," from which fully as much gold can yet be extracted as had been taken out by the first crude process. Yet in this imperfect manner $2,000,000 in gold have been taken out of a single claim, and over $800,000 from another, not a tithe of which has been worked. Eight distinct river beds, each 40 or 50 feet wide, have been crossed nearly at right angles in working the latter claim, and the dirt lying close on the bed rock of these river channels is always amazingly rich. Drifts following these obsolete water courses to right and left, must be excessively profitable.

The washing is done about once in two months, or as often as the boarded pits used for the purpose are filled with the gravel and cement, and the latter sufficiently disintegrated by the action of the elements. In the first place, it is so solid as to require blasting. To illustrate the waste of the usual method, it is related that an Irishman employed by a certain company received as a gift a pile of "tailings" to keep him busy during a slack season. By careful re-washing, he obtained $26,000 in gold, and still another washing yielded him $15,000, after which he sold the Fortunatus' earth for $6,000 to a party who obtained $12,000 more from it. We have not heard whether it is producing still or no. Mills are now beginning to multiply in connection with the gravel or cement claims, and it is confidently believed that their product can be doubled by this means.

Coppering Iron.

A new process for this purpose is patented by a Mr. Bernabé, giving, as represented by those who have examined it, an inseparable cohesion of the metals, and what is more novel if true, at an expense little greater than the cost by weight of the copper deposited. The foreign reports state that the perfect adhesion of copper to iron is a new achievement in electro metallurgy. This is an error. We are not certain how it may be in Europe, but in this country, where electro-metallurgy has been practised in some of its applications to a greater extent than in any other, the electroplating of iron with copper is done as perfectly as that of any other metal. The expense of the chemicals required, with that of cleansing the iron of oxides, has hitherto rendered coppered iron more expensive than copper, in thin plates; and if this expensiveness has been overcome, as represented, the invention will be of immense value. Iron ships, for example, would be relieved of one of their two great disadvantages—that of fouling—as compared with wood: for we presume there would be no difficulty in hardening the porous copper deposited in this way, by rolling the plates.

ISSUED FROM THE U. S. PATENT OFFICE,

FOR THE WEEK ENDING MARCH 19, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

62,917.—Stop Motion for Feeding Mechanism of Carding Engines.—W. L. Ainsworth, and A. D. Wright, Lowell, Mass.

We claim the peculiar stop motion or mechanism for effecting the disengagement of the bevel gears, S' and X, and we also claim the combination of such a stop motion or its equivalent, and the laying and feeding mechanism as described.

And we also claim the combination of the alarm apparatus or its equivalent, with the stop motion and the laying and feeding mechanism applied to or making part of a carding engine as described, the whole being substantially as and for operation in manner and for the object or purposes as hereinbefore explained.

62,918.—Staple for Artificial Teeth.—J. Lambert Asay, Philadelphia, Pa.

I claim the use of staples, a, with their bent portions projecting from the teeth as a means of securing the latter to a vulcanizable gum plate or to vulcanizable gum attached to a metal plate as and for the purpose herein set forth.

62,919.—Concentrating Sulphuric Acid.—D. Ashworth, and R. B. Eaton, Woburn, Mass. Antedated March 12, 1867.

First, We claim condensing or rectifying oil of vitriol by passing the same, through a series of glass retorts, in combination with a heating apparatus, substantially as described.

Second, We claim the combination of a series of glass retorts, G, with the pan, E, and furnace, A, substantially as and for the purpose specified.

62,920.—Steam Engine.—Henry Bailey, New York City.

First, I claim the combination with the cylinder and its piston, of the steam or water tight box or chambered cylinder head, pitman and revolving crank all arranged for operation within said head in open communication with the cylinder, substantially as specified.

Second, The chambered cylinder head, H, constructed with its internal form corresponding to the course described by the pitman in its action, substantially as shown and described.

62,921.—Carding Engine.—S. R. and G. W. Ballard, Coldwater, Mich.

First, We claim the rotating tubes, a a a, having removable tips or points, h, when the same are constructed and operated as described for the purpose specified.

Second, We claim the arrangement of driving pulley, d, single belt, E, friction-roller belt-tightener, r, and a series of rotating tubes, a a a, in combination with worm gear, s t, heart cam, Q, finger, o, lever and slide L l, for moving the guide frame, K, as described for the purposes specified.

62,922.—Manufacture of Friction Matches.—William Baustian, Davenport, Iowa. Antedated March, 11, 1867.

I claim the composition wherein the matches are dipped as hereinbefore described.

62,923.—Machine for Making Nuts.—Albert B. Bean, New Haven, Conn.

I claim the crowner, T, in combination with the punch, L, and die, A, and hinged holder, U, substantially as and for the purpose set forth.

62,924.—Steam Engine Slide Valve.—William Birch, Cincinnati, Ohio.

First, I claim in the rectangular or square frame, the arrangement of the straight and angular packing strips to be expanded by steam in the manner described.

Second, The valve in the packing frame to admit oil to the steam or valve chest and also admit air to prevent a vacuum in the cylinder and steam pipe.

62,925.—Ink-Well Cover.—John A. Blake (assignor to Blake & Brothers), New Haven, Conn.

I claim the combination of the cover, C, and the shank, D, when hinged together by a hook formed upon the one, and a corresponding bar on the other, substantially in the manner herein set forth.

62,926.—Exploding Torpedoes in Oil Wells.—R. Boeklen, Brooklyn, N. Y.

I claim the application of two or more torpedoes in an oil well, the same being connected together and exploded simultaneously by one continuous electric current, substantially as and for the purposes herein described.

62,927.—Cover for Kilns of Sugar Refineries.—William R. Bradford, Charlestown, Mass.

I claim the construction or formation of a kiln cover by casting the metal upon a fire brick or bricks, or other similar material, and so as to secure the metal and brick together, substantially as set forth.

62,928.—Railroad Picks.—John E. Brastow and E. K. Ingoldsby, Van Buren Center, N. Y.

We claim attaching the pick to its handle by forming a head of the strap, C, constructed and applied substantially as and for the purposes herein set forth.

62,929.—Water Wheel.—S. J. Bridge and A. M. Craig, Portage City, Wis.

We claim a water wheel having the spiral buckets, b, and the tangential guides, a, combined and arranged substantially as shown and described.

62,930.—Wool Press.—George M. Briggs, Boston, N. Y.

I claim the separate twine receptacles, 1, 2, 3, 4, 5, 6, and corresponding grooves, a a a and b b b, when combined and arranged with the stationary bed, A A, fixed compressing box, D D, and the follower, E, substantially in the manner and for the purposes described.

62,931.—Axle Box.—George Brill, Philadelphia, Pa.

I claim, First, The sliding door, F, and pin, H, with its collar, h, the whole being constructed and adapted to an axle box, substantially as and for the purpose herein set forth.

Second, The ribs, y y, and lip, x, arranged on the box for the retention of the door as set forth.

Third, The packing strip, G, adapted to the door and box as described for the purposes specified.

62,932.—Extension Ladder.—Charles R. Bryant, Frankfort, N. Y., assignor to Calvin Eaton, Webster, N. Y.

I claim in combination with the extension ladder, A and B, the rope, D, and retracting rope, C, arranged and operating substantially in the manner shown and described and for the purposes set forth.

62,933.—Hydrants.—Joseph H. Buckley, New Haven, Conn.

I claim the combination of the valve, C, having its seat formed and packed in the manner described, with the chamber, B, provided with waste passage or passages, I, and with the cone, f, on the valve rod, when the said passage or passages, I, are united or arranged so as to form a central support for the valve rod, substantially as herein set forth.

62,934.—Car Spring.—G. W. Buss, Boston, Mass.

I claim as a new article of manufacture, a spring for railway and other carriages, made up of the following combined devices, namely: an open metal box, a lever hung upon a fulcrum, in one end of the box and having its free end projecting out from the opposite end of the box for connection with the truck, and a spring interposed between the lever and the roof of the box, the box serving as a bearing for the fulcrum pin, as a means of connection between and support of the spring and lever, and as a means of applying the spring, lever and fulcrum to the body of the carriage, the whole being arranged to operate substantially as set forth.

62,935.—Kindling Arrangement for Stoves.—Harvey L. Byrd, Baltimore, Md.

I claim a kindling basket beneath stove grate or furnace grate, substantially as described.

62,936.—Composition for Roofing, Covering Wood, etc.—John Caflisch, Union Mills, Pa.

First, I claim the combination of lime with coal tar, in the manner substantially as and for the purpose herein shown.

Second, The composition of coal tar, sand, quicksand or clay, and lime, substantially as and for the purpose herein described.

62,937.—Apparatus for Regulating Draft in Steamboat and other Chimneys.—J. B. Campbell, M. D., Cincinnati, Ohio.

First, I claim the enlarged end of the smoke pipe, B, provided with the wings, E E, and with the curbs, D D, constructed and used in the manner above described.

Second, The wings, E E, hinged and adapted to the purpose described.

62,938.—Awl Handle.—Nathan S. Clement, New Britain, Conn.

I claim, as a new article of manufacture, the awl handle herein described, having a tapering head, B', or a movable stem operated by a nut, c, locked in the cover, C, by being headed or enlarged to match the recesses provided in said covor, as herein set forth.

62,939.—Envelope Machine.—John H. Cooper (assignor to E. J. Spangler, W. E. Lockwood and E. D. Lockwood), Philadelphia, Pa.

I claim, First, Knives attached to one cross head or plate E, and so arranged as to cut or sever the strip of paper at several points simultaneously, substantially in the manner described during one movement of the said cross head.

Second, The combination of the said cross head, its drivers, the blade, 3, and folding rollers, T and T', so that the paper may be cut and folded during one movement of the cross head.

Third, The stationary arm, H, projecting through an opening in the cross head, E, and carrying rollers, f, in combination with the rollers, J.

Fourth, The combination of the intermittently-revolving drawing rollers, I and J, with the continuously-revolving feed rollers, P and Q, the whole being arranged to act on the paper, as set forth.

Fifth, The system of rods, x x' and x'', arranged for maintaining the paper in contact with the table and imparting proper tension to the paper.

Sixth, The guiding plates, v and v', connected together by the system of levers, herein described, or the equivalents, to the same and arranged for the proper guidance of the paper in a central course, substantially as described.

62,940.—Car-brake Shoe.—Edmund L. Countiss, Philadelphia, Pa.

I claim the combination of the shoe with the catches, c c, and the square-headed lug, d, attached together with the receiver, b, shaped as shown with its slotted hole, l, socket, g, with its flanges and the double inclined groove, constructed and arranged in the manner described.

62,941.—Soldering Iron.—C. O. Crosby (assignor to himself and H. Kellogg), New Haven, Conn.

I claim the body, A, and point, B, when constructed and united by the enlargement of the point within the body, substantially as herein described.

62,942.—Screen Plate for Paper Machinery.—Francis Curtis, Auburndale, Mass., assigns one half of right to Russell & Son, Lawrence, Mass.

I claim a screen plate for paper machinery, constructed of the material known as hard rubber.

62,943.—Flour Bolt.—William Derwent, Jr., Rockford, Ill.

I claim the short conveyor interposed between the upper and lower bolts, substantially as and for the purpose set forth.

62,944.—Suspended.

62,945.—Method of Holding Edged Tools on Grindstones.—Patrick V. Dunn, Calamus, Wis.

I claim, First, The combination and arrangement of the frame, C C C, the clamp, D, and the scythe device, E, substantially as described for the purposes specified.

Second, The combination of the weight, I, lever, J, and wheel, K, as described for the purposes specified.

62,946.—Hopple for Horses.—Robert N. Eagle, Washington, D. C.

I claim a hopple in which the leg bands are connected by loops which slip upon each other or upon a device interposed between them or by a single loop connected more directly to another leg band as in Figs. 5 and 6, substantially as described.

62,947.—Blind and Shutter Fastener.—Charles H. Eddy (assignor to himself and Theodore J. Dickerson), Auburn, N. Y.

I claim the shutter or blind fastening composed of lever, G, provided with hooks, E F, attached to the sill, H, in combination with notches, C D, on the blind to be operated substantially as and for the purpose set forth.

62,948.—Saw-gumming Machine.—James E. Emerson, Trenton, N. J.

I claim, First, The thumb screws, D D, arranged and operating as pivots, substantially as and for the purpose specified.

Second, The combination of the thumb screws, D D, and adjustable handle, I, for exerting the pressure directly in line with the cutting part, substantially as described and represented.

62,949.—Milk Can.—James H. Farley, Lowell, Mass.

I claim the ring, A, constructed as described in combination with the bottom part of a milk can, substantially as described and for the purpose herein set forth.

62,950.—Apparatus for the Manufacture of Vinegar,—Joseph Firmenich, Buffalo, N. Y.

I claim the combination with the vessel, C, of the concave condensing surface, N, perforated diaphragm, i, and porous stratum, j, with the pipe, K, provided with perforated head, l, constructed substantially in the manner and for the purpose set forth.

I also claim, in combination therewith, the tempering vessel, E, constructed as described, with the pipe, d, and vapor generator, A, arranged and operating substantially as described.

I also claim the cooling vessel, P, constructed as described, in combination with the water space, H, arranged and operating as described.

62,951.—Peat Machine.—John T. Foster, Jersey City, N. J.

I claim, First, The stirrer or agitator formed of vanes, b b and d d, connected with a revolving shaft, B, and of a convolute shape or character inclining as they revolve to press the material downwards for operation in combination with a reversely moving cylinder, D, substantially as specified.

Second, The combination with a revolving stirrer or agitator, of reversely operating concentric cylinders formed with oblique slots in or through their peripheries for operation in connection with an intermediate stationary slotted cylinder, substantially as specified.

Third, The combination with the obliquely slotted revolving outer cylinders, F G, and forming tube, I, of the director, J, substantially as shown and described.

Fourth, In combination with the forming tube, I, the yielding gage, L, operated by the material in its delivery as described.

Fifth, The combination with the forming tube, I, and yielding gage, L, of the knife, M, moved forward to effect the cut by the action of the gage through mechanism connecting it with the mill, substantially as herein set forth.

Sixth, The side guide, K, in combination with the knife, M, and gage, L, for operation together, essentially as specified.

62,952.—Machine for Making Pasteboard Boxes.—John T. Foster, Jersey City, N. J.

First, I claim the combination with the reciprocating feeding bar, D, of a former so constructed as that, in the one motion of the bar, the blank is creased and bent over the same, and its one edge or end made to overlap the other, substantially as specified.

Second, The combination, with the reciprocating feeding bar, D, and former operating as described, of setting discs or wheels arranged to act on the bent edges of the box or case, as it is delivered from the former, essentially as herein set forth.

62,953.—Steam Generator.—John Hafer, Bedford, Pa.

First, I claim the combination of the cones and flanges, with a steam boiler farranged and operating substantially as and for the purpose set forth.

Second, The combination of the cones and flanges, with a steam boiler, and with the tubes, K, arranged and operating substantially in the manner and for the purpose set forth.

62,954.—Castor for Furniture.—E. Hambujer, Detroit, Mich.

I claim the equatorial balls, e, moving round the entire circumference of the grooved chamber, d, in combination with the top ball, f, operating relatively with the roller ball, E, substantially as described, for the purpose specified.

62,955.—Garden Syringe.—A. F. Hammond, Houston, Ohio.

First, I claim the arrangement of the cylinder, e, spring piston, d, operated by rack and pinion, substantially as described and represented.

Second, In combination with the subject matter of the first claim, I claim the movable nozzle, operating as described.

62,956.—Preparing and Preserving Wood.—Thomas Hanvey, Lancaster, N. Y.

I claim the process of preparing wood for preservation, substantially as herein described.

62,957.—Doubletree.—Jacob B. Hough, Lebanon (assignor to himself and Samuel Braden), Ohio.

First, The combination of the doubletree, D, with the fulcrum block, E, and guides, a a, constructed, arranged, and operating in the manner and for the purpose described.

Second, I claim the stay block, F, in combination with the compensating doubletree and its fulcrum block, arranged to operate conjointly with the guide rods, a a, substantially as and for the purpose set forth.

62,958.—Self-Adjusting Guide Roll for Paper Mills.—Robert L. Howe, Westbrook, Me.

I claim the swinging base, A, set upon the stationary base, B, as described

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and having the two rollers, a b, all constructed, arranged, and operating as set forth, and for the purposes specified.

62,959.—CARTE DE VISITE EXHIBITOR.—P. Gengembre Hubert, New York City.

First, I claim the herein described "revolvicon" in which cartes de visite are stored, as in fig. 2, and in which they are exhibited as in fig. 1, by dropping in sight one after the other, by their own gravital force, arranged and operating as specified.

Secondly, The combination of the piece, H, pin, F, and wheel, G, with the carte de visite, J J, etc.

Thirdly, The combination and arrangement of the leg, R, with the leg. P', of the bottom, B, to obtain the two positions of the instrument, as specified.

Fourthly, The self-adjusting reflector, E, arranged and operating as set forth.

62,960.—APPARATUS FOR COOKING AND PRESERVING FRUITS.—William Janney, Martinsville, Ohio.

First, I claim the fruit pan, D, in combination with vessel, C, as above described, and for the purpose set forth.

Second, The steam chest, B, pipe, F, and vessel, C, in combination with fruit pan, D, for the purposes above specified.

62,961.—COAL BURNING STOVE.—John H. Keyser, New York City.

First, I claim a stove which is composed of two apartments, B E, one arranged below the other, with a removable open-grated fire pot, which is provided with a grate, G, said pot being suspended free from the sides of the lower cylinder, B, and sustained by a cast iron flanged ring, C, which is secured permanently to cylinder, B, and which forms the base for and means of attachment of the cast iron section, D, of the cylinder, E, substantially as described.

Second, In combination with grated or open fire pot, F, suspended within a cylinder, B, by means of a cap ring, C, I claim the grate, G, when it is sustained independently of the fire pot, and by the cylinder, B, substantially as described.

Third, The combination and relative arrangement of the air inlet passages, e, with a suspended fire pot, F, and with the two detachable cast iron section C D, substantially as described, and for the purpose of cooling and preventing said sections from warping.

Fourth, An open grated fire pot, F, which is suspended within the cylinder, B, and combined with the removable sections, D E, outlet, g, descending flue, h, and damper, s, the latter being located opposite the outlet, g, substantially as described.

62,962.—RADIATING ATTACHMENT FOR HOT AIR FURNACE.—John H. Keyser, New York City.

In the construction of radiators to be applied to hot air furnaces, I claim the arrangement of a central ascending flue, c, passing through one or more radiating drums, and leading into the center of an upper drum, in combination with descending flues arranged around said flue, c, and communicating with the lowermost drum and an exit pipe, g, so that without the use of a damper the products of combustion rising from the fire chamber of the furnace shall be equally diffused throughout the said drums and pipes, substantially as described.

62,963.—MACHINE FOR MAKING CARRIAGE BOLTS.—William Koplin, Newcastle, Pa.

I claim the combination, with the dies, a a', b b', of the discs, c H, operated as described, to form the square on the bolt.

The die, c, in combination with the swedge, I, on the lever, F, operated as described.

62,964.—METAL CLASP FOR BARREL HOOP.—David M. Lawrence, Washington, D. C.

I claim the buckle or plate, A, with its slotted or loop opening to receive the iron hoop, and with shoulders, c c, at each end, together with the tongue or flange, substantially as set forth in the foregoing specification, and for the purposes therein indicated.

62,965.—COTTON PRESS.—Eugene McDonnell, Baltimore, Md.

I claim a cotton bale compresser provided with the following parts: fulcrum beams, C C, power levers, I I, toggle arms, L L, lifting rods, M M, rising follower, E, adjustable upper bed, G, and the whole driven by means of a pulley chain, N, and capstan, P, or its equivalent, to which the power of horses may be applied, all arranged and operating substantially as and for the purpose herein specified.

I also claim the combination of the fulcrum beams, c c, arranged between the follower, E, and power levers, I I, through means of the toggle arms, L L, and lifting arms, M M, substantially as herein set forth.

I also claim the adjustment of the bed, G, by means of the blocks or timbers, H, and the means described, or the equivalent thereof, for raising and lowering the bed, substantially as described.

I also claim the alternate arrangement or interweaving of the fulcrum beams, C C, and toggle arm, L L, as specified.

62,966.—GRINDING MILL.—Christopher Moegling, Milwaukie, Wis.

First, I claim the adjustable wings, E, in number more or less, when used upon the periphery of the rotating stem of a grain or flowing mill for the purposes specified.

Second, The pipe, g, the cover, h, the elbow, k, and the educting pipe, I, when provided with the cap, J, all combined and arranged substantially as set forth, and so operate in connection with the wings, E, for the purposes specified.

62,967.—ATTACHING DOOR KNOBS TO THEIR SHANK.—Wallace T. Munger (assignor to Thomas Kennedy), Branford, Conn.

First, I claim the combination of the cylinder, A, and plug, C, and tube, I constructed and arranged so as to receive and discharge the requisite quantity of filling substances, substantially as herein set forth.

Second, In combination with the above I claim the adjusting spindle, F, arranged to gage the quantity of filling substances, substantially as herein set forth.

62,968.—ADJUSTABLE ESCUTCHEON FOR NIGHT LATCHES.—Wallace T. Munger (assignor to Branford Lock Works), Brandford, Conn.

I claim the escutcheon, E, in combination with a lock or latch when made adjustable thereon, substantially in the manner herein set forth.

62,969.—STEAM-ENGINE SLIDE VALVE.—John Nesbitt, Northfield, Vt., assignor to himself and Levi B. Tyng, Lowell, Mass.

First, I claim the arrangement of the valve, d, with reference to the packing, g g, in its ends substantially as herein described.

Second, I claim the chamber, l l, over the valve, d, constructed in the manner and for the purpose substantially as herein set forth.

Third, I claim the combination and arrangement of the valve, d, shield, h, chamber, l l, and exhaust port, K, for the purpose substantially as described.

Fourth, I claim the projections, f f, on the ends of the valve, d, constructed in the manner and for the purpose substantially as herein described and set forth.

62,970.—HORSE HAY-FORK.—J. H. Parker, J. T. Hall, and Isaac Pierce, Trenton, N. Y.

First, I claim two spiral tines one having a right hand, the other a left hand twist, and so arranged and held with relation to each other when in the hay that it will be bound and held from sliding or slipping off the tines until they are allowed to revolve at the will and pleasure of the operator.

Second, The combination and arrangement of the yoke, B, cross head, A, tines, c, ratchet wheels, e, and pawl, f, constructed, arranged, and operating in the manner herein described and for the purpose set forth.

62,971.—CULTIVATOR.—Levi Repp, Tiffin, Ohio.

First, I claim the construction of the central beam, A, of a three beam cultivator with a jointed extension, A', having a shovel applied to it, and also a spring, g, for keeping it down and staying it laterally, substantially as described.

Second, Pivoting the front ends of the three beams, A B B, to U-shaped clevis plates, a a, substantially as described.

Third, The construction of the shovels, m m, with narrow and wide wings, and so that they can be reversed at pleasure, substantially as described.

Fourth, In combination with the forward pivot connections of the three beams, A B B, I claim the lateral extension braces, C C, and still standards, E, connected to beam, A, in front of the joint, d, by a bolt, e, substantially as described.

62,972.—DOOR FOR GRAIN RAILROAD-CARS.—G. B. Rich, Lafayette, Ind.

First, I claim the application of the sliding joint plates, p, to the grain doors of railroad cars, substantially in the manner and for the purposes herein shown and described.

Second, Connecting the said joint plates by means of the pivoted levers, b and d, substantially as and for the purposes set forth.

Third, Suspending the grain door of railroad cars by jointed rods, n, or chains, or any equivalent device, whereby they may be fastened up out of the way when not required for use.

62,973.—BED BOTTOM.—J. Rickard and J. Cook, Philadelphia, Pa.

We claim the strips, b and b', having dove-tailed ends adapted to dove tailed sockets, d, in combination with the springs, c c, and slats, h, substantially as described.

62,974.—SAFE.—Benjamin Sherwood and D. Fitzgerold, New York City. Antedated March 12, 1867.

First, We claim the spherical fire and burglar proof casket, constructed substantially as specified.

Second, Arranging the said casket within a safe or other receptacle, as set forth, which is otherwise filled by a book case or its equivalent, as described.

Third, Constructing the safe with the opening of access on the side thereof, in combination with a book case inserted therein, and arranged so as to be readily withdrawn therefrom horizontally, all substantially as described.

Fourth, Combining with the safe and the book case, as above, the platform, F, or equivalent support for the book case when withdrawn from the safe as aforesaid.

62,975.—FARM GATE.—A. D. Smith, Grafton, Ohio.

I claim the gate, A, constructed as described, in combination with the posts, B C, the post, B, being so arranged in relation to the gate that it forms the support fulcrum, and slide combined upon which the gate rests, slides, and turns when being opened as closed as described.

62,976.—CARRIAGE FOR CHILDREN.—Charles Spring, Dorchester, Mass., and Andrew Spring, Weston, Mass.

We claim, in combination with the body, stationary axle and two main wheels of a child's carriage, a leader wheel, n, whose axis is supported in journals, arranged out of line with the shaft, i, substantially as shown and described.

We also claim the means or mechanism for relative adjustment of the shaft, i, and axle, m, and for changing the position of the axle, substantially as described.

Also the arrangement of the pole so as to be capable of a vertical swinging movement, when this movement is fixed and determined, substantially as set forth.

Also combining with the carriage body the crib box, o, substantially as described.

62,977.—LATHE FOR CHASING AND BACKING DOWN TAPS.—W. X. Stevens, Worcester, Mass., assignor to J. M. and D. B. King, Waterford, N. Y.

First, I claim operating the guide bar, F, which regulates the taper of the tap, so as to channel it longitudinally by mechanism constructed substantially as described.

Second, The arrangement of the mandrel, B, of the pattern, S, acting in combination with and indirectly through the lever, G, rock shaft, f, cams, e, and guide bar, F, on the tool stock, E, for throwing back the tool, essentially as herein set forth.

Third, The combination of the pattern, S, on the mandrel, the lever, G, with its rock shaft and lifters, and the bar, F, raised by the latter and acting on the lifting end of the tool stock, substantially as and for the purpose or purposes specified.

62,978.—CAR COUPLING.—Ithamar W. Stuart, Jun., Charlottesville, Ind.

First, I claim the bumper head, C, when formed with an upwardly projecting part or hook grooved upon its inner side, substantially as herein shown and described, and for the purposes set forth.

Second, The combination of the bar, D, arms, d1 and d2, balance guard, E, chain, G, and link, F, with each other and with the bumper, C, draft bar, B, and end of the car, A, substantially as herein shown and described and for the purposes set forth.

62,979.—EGG DETECTOR.—A. F. Summers and C. Nye, Peoria, Ill.

We claim the chamber, A, provided with eye hole, D, the adjustable screw, B, provided with receptacle for the eggs, reflector, C, and ledge, E, when all shall be constructed, combined, arranged, and operated as and for the purpose set forth and described.

62,980.—HORSE-SHOE NAIL MACHINE.—Ephraim Thomas, Middleboro, Mass.

I claim the bed knife as made with the channels, S, for receiving and guiding the head projection of the nail plate during its entrance into the machine.

I also claim the combination of the point shear, O, and its fellow shear, M, with the dies for separating the blank from the nail plate and heading it as described.

62,981.—BUTT MACHINE.—Thomas Tracy, New Britain, Conn.

I claim the spring button, f, and tongued bar, c, or their equivalents, in combination with suitable mechanism for operating said bar, substantially in the manner and for the purpose as described.

62,982.—INSTRUMENT FOR SUPPORTING FRACTURES.—Samuel B. Tucker, St. Louis, Mo.

I claim the invention of the plates, E E, and the springs, F F F F and G G, making, when put together, the instrument for the support of fractures of the scapulæ, clavicles, and vertabræ of the cervix and spine.

62,983.—MACHINE FOR CONCENTRATING ORES.—Thomas Varney, San Francisco, Cal.

First, I claim the use of the disk, A, divided into compartments.

Second, The trough, B, all constructed in the manner and for the purposes set forth.

62,984.—CAR COUPLING.—W. Y. Warner, Wilmington, Del.

First, I claim the pin, D, arranged to operate within the opening, c c, and recess, a, of the block, A, and to slide in a cross bar, F, which can turn in projections on the said block, all substantially as set forth for the purpose specified.

Second, The shoulder, m, arranged as a support for the pin, D, substantially as specified.

62,985.—HARVESTER CUTTER-BAR.—Thomas Welch, Churchville, N Y.

First, I claim the skeleton or shell head, H, constructed as described, in combination with the knife bar of harvesters, substantially as and for the purposes set forth.

Second, The arrangement of the skeleton or shell head, H, with the boxes, B and B', pitman, P, and set screw, s, substantially as and for the purposes set forth.

62,986.—SEWING MACHINE.—Henry F. Willson, Fort Wayne, Ind., assignor to W. G. Wilson, Cleveland, Ohio.

First, I claim a needle bar receiving an independent vibration from a crank, in combination with an oscillating lever, and with vibrating needle bar holder, in such a manner as to produce a compensating vibration, substantially as described.

Second, The set screw, J, in combination with the eccentric, E', and oscillating lever, H, for the purpose of affecting the length of the stitch by regulating the throw of the needle to the left, said lever being jointed to the vibrating fulcrum of the needle bar, as described.

Third, I claim the stationary shuttle, constructed and supported substantially as described, in combination with the needle bar and oscillating bar, for the purpose described and set forth.

62,987.—BRUSH.—John Brown Alden (assignor to himself and Edwin C. Cleveland), Worcester, Mass.

I claim the arrangement and combination of the parts of the brush marked A B and C, whereby the parts, A B, may be reversed or turned end for end, substantially as described for the purposes herein set forth.

62,988.—DISTILLATION OF BROMINE AND IODINE.—David Alter (assignor to Charles W. Bodey), Freeport, Pa.

I claim the use of an alkali to absorb the fumes of bromine and hydrobromic acid while in process of distillation, substantially as herein shown and described.

62,989.—GRAPE AND OTHER ARBORS.—James O. Attick (assignor to himself and George W. Holgen), Dayton, Ohio.

I claim the metallic casting, A, constructed substantially as described, and used for the purposes herein set forth.

62,990.—SHINGLE MACHINE.—Sherman E. Anthony, Stillwater, N. Y.

First, I claim the disconnected bolt carriages, B, with projections, e, operating with the toothed wheels, d, substantially as described for the purpose specified.

Second, The operating of the sliding dogs through the medium of the T-headed screws, H, flanged spring plate, G, pin, k, arm, f, and lip, g, substantially as described for the purpose specified.

Third, The fixed or stationary dogs, Z, in connection with the sliding bars, M, and the plates, N, on the framing, having beveled or diagonal ends, substantially as shown and described.

Fourth, The fixed plate, i, in combination with the slotted dogs, F, substantially as and for the purpose specified.

62,991.—CHEESE VAT.—Grinmon Austin, Denmark, N. Y.

I claim the within-described device for cooling milk, so constructed that the water which passes around the milk receiver to cool the same, will act upon a wheel or equivalent device, operating the parts which causes continuous agitation to the milk, substantially as specified.

62,992.—CHURN DASHER.—Anson A. Avery, Cardiff, N. Y.

I claim the slotted and fluted fingers, a a and e e, in combination with the cross head, B, and the cross beams, D D, arranged and operating substantially as herein described.

62,993.—INJECTOR FOR STEAM GENERATORS.—Andrew Barclay, Kilmarnock, North Britain.

First, I claim the combination with the steam and water nozzles of an injector of a fixed casing containing any non-conducting substance interposed between the said nozzles, as herein shown and specified.

Second, The arrangement of an adjustable air-tight packing between the steam and water inlets, as hereinbefore described.

Third, The arrangement and construction of apparatus for injecting or ejecting fluids and liquids, in which a double set of nozzles is employed in combination with an injecting or water nozzle, so as to form annular jets of steam and water, as hereinbefore described.

Fourth, The arrangement and construction of apparatus for injecting or ejecting fluids of different temperatures, whether in immediate contact or not with the steam nozzle, as hereinbefore described.

Fifth, The combination of the exterior main portions of the instrument with the pillars or studs or equivalent devices for connecting the same under the arrangement herein specified, so that the stuffing boxes, joints, and packing are rendered accessible, and capable of being readily adjusted, as set forth.

Sixth, The application of a set of variable nozzles and throats to apparatus of the kind hereinbefore described, in the manner specified.

62,994.—GUN WORM.—Henry C. Bascom, La Crosse, Wis.

I claim the gun wormer consisting of the thimble, c, worm screw, m, and revolving nut, b, arranged in such a manner that the said screw shall be extended or retracted, substantially as described.

62,995.—SAW MILL.—O. A. Bassett and Erasmus Smith, Norwich, N. Y.

First, We claim the combination of the friction wheels, C E F, and wheels, G I, or equivalent, and the friction wheels, K S, with each other and with the saw shaft, B, and feed shaft, R, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the toothed sliding bar, V, gear wheels, W Y, and shaft, X, with each other and with the friction carriage, D, substantially as herein shown and described, and for the purpose set forth.

62,996.—AUTOMATIC BOILER FEEDER.—Hiram Beadle, Washington, D. C.

First, I claim the arrangement of the pipe, B, condenser, D, valve, C, pipes, I and N, with reference to the chamber, A, and float, E, substantially as herein set forth.

Second, The combination of the supply pipe, B, valve, C, and chamber, A, with the float, E, rod, F, and valves, K and K', substantially as and for the purpose set forth.

Third, The combination of the rod, F, yoke, G, rods, I, and valves, K and K', substantially as and for the purpose set forth.

62,997.—STARCH SIRUP.—H. C. Becker, New York City.

I claim a composition which is made of the ingredients and substantially in the manner set forth and described.

62,998.—BURGLAR ALARM.—Henry Behn, New York City.

First, I claim the arms, G and G', rods, J and J', and lever, C, operating the bell hammer through a lug, adjusted, combined, and arranged, substantially as specified.

Second, I claim the arrangement of the pendulum, H, in combination with the stop lever, N, operated by a projection, w, fast to the lever, C, in the manner and for the purpose as set forth.

62,999.—SHUTTLE CARRIER FOR SEWING MACHINES.—Walter Bennett, Hunt's Hollow, N. Y.

I claim the guide rod, C, applied to the bed or cloth plate, A, by means of the screws, D D, and springs, e e, or their equivalents, substantially as and for the purpose specified.

I further claim constructing the shuttle carrier, B, with a part or portion, b, to serve as a bearing surface against the cloth plate, A, when used in combination with the adjustable guide rod, C, arranged and applied substantially as set forth.

63,000.—ROCKING CHAIR.—Hermann Berg, Sprin field, Mass.

First, I claim constructing the side frames of a rocking chair of elastic strips, b b' c c', substantially as and for the purpose set forth.

Second, The combination of removable cross bars, a a1 a2, with the elastic side pieces, B C, of a rocking chair, substantially as and for the purpose described.

Third, The flexible back, E, in combination with the seat, D, top cross bar, a', and side pieces, B C, constructed and operating substantially as and for the purpose set forth.

Fourth, The yielding tops, e, in combination with the runners of a rocking chair, constructed and operating substantially as and for the purpose described.

63,001.—GRAIN DRILL.—Lyman Bickford, Macedon, N. Y.

I claim, First, The construction of the distributing wheel whereby it is adapted to the discharge or delivery of grain upon its opposite vertical sides or faces, for the purpose specified.

Second, The distributing wheel, provided with the enlarged hub or center, and with curved or angular sides or faces, substantially as described.

Third, The starting ribs, formed upon the curved or angular sides or faces of the vertical distributing wheel, substantially as and for the purpose described.

Fourth, The casings upon the opposite sides of and in combination with a a double distributing wheel adapted to the delivery of grain upon its opposite vertical sides, substantially as described.

Fifth, Providing the lugs or ears, through which the casings of the distributing wheel are fastened to each other, with the interlocking faces, substantially as described.

Sixth, The casings of the distributing wheel provided with the external flanges and with the side delivery or discharge opening, substantially as described.

Seventh, The employment of the casings, provided with the external flanges and side delivery openings, in combination with the vertical starting ribs or teeth on the side of the distributing wheel, substantially as described.

Eighth, The employment of a slide, in combination with the double distributing wheel for closing the seed run upon one side or face thereof, and simultaneously opening that upon the opposite side or face, substantially as described.

Ninth, The adjustable block, or its equivalent, at the end of the grain box, in combination with the slide, substantially as and for the purpose described.

63,002.—CARPET BAG.—Chas. F. Blakslee, Brooklyn, N. Y.

I claim a traveling-bag frame provided with sunken perforations, a, having a connecting channel, e, for the purpose described as herein specified.

63,003.—WASHING MACHINE.—Asa Blood, Sr., Janesville, Wis.

I claim the pendent or swinging presses, C C, placed in suds boxes, A A, which are connected together substantially as shown; and operated through the medium of the arms, h, rods, j, and lever frames, D D', one or both, substantially as shown and described.

I also claim the connecting of the two suds boxes, A A, in such a manner as to allow a space, B, between them for the rods, j, to work in, substantially as set forth.

I also claim the combination of the hinges, m, handles, F, uprights, E, and lever frames, D D', as and for the purposes specified.

I further claim the combination of the two suds boxes, A A, lever frames, D D', presses, C C, rods, j, arms, h, and springs, G, with the lids or covers, b, fluted or otherwise, and all arranged to operate in the manner substantially as and for the purpose set forth.

63,004.—GAS HEATER AND PETROLEUM STOVE.—Alonzo T. Boon, Galesburg, Ill. Antedated March 1, 1867.

First, I claim the bundle of short, fine wire, F, in combination with the horizontal tube, C, substantially in the manner and for the purposes as herein set forth.

Second, The solid heater, E, as constructed and provided with a cone, g, in combination with the horizontal tube, C, substantially in the manner and for the purposes as herein set forth.

Third, The ogee cylinder, B, in combination with the funnel-shaped bottom, a, of the stove, substantially in the manner and for the purpose as herein set forth.

63,005.—CORSET FASTENING.—James Bowers, New York, N. Y.

I claim a fastening for stays or corsets composed of eyelets C, inserted in one of the parts A, just behind its hem b, and plates d, formed or provided with hooks e, and attached by loops c, to the front edge of the other part A, substantially as herein shown and described.

63,006.—REED MUSICAL INSTRUMENT.—John C. Briggs, Ansonia, Conn.

I claim the separation of the wind chest of a melodeon by a flexible diaphragm D, substantially as described for the purpose specified.

63,007.—WATER ELEVATOR.—Ransome Brown, West Edmeston, N. Y.

I claim the arrangement of the windlass B, stop c, pivoted to the bar d, bucket C, with its valve and curved hook a, all constructed and operating as set forth.

63,008.—GATE.—T. I. Burhyte, Fond du Lac, Wis.

First, I claim a gate constructed with the high posts R, provided with the counterbalancing weights, said gate being pivoted to turn in a vertical plane substantially as described.

Second, The spring catches f, connected to the vertical rod b, and arranged to operate in connection with the gate as set forth.

63,009.—HEAD BLOCK FOR SAW MILL.—George Burket and Samuel M. Gaskill, Bluffton, Ohio.

We claim the bar G, provided with the adjustable bevelled plates H H', secured by clamps I I, substantially as shown, and connected or arranged with the rack F, and also provided with the pendent bars J J', the above parts, being used in connection with the stop K for operating the rack F, substantially as described.

63,010.—LANTERN.—William Burns, Chicago, Ill.

First, I claim the construction and arrangement of a lantern having its cap, globe and oil cup separately connected and detachable by screws so that no part of the weight of the lantern is supported by the screws of the globe substantially as shown and specified.

Second, Attaching and supporting the globe of a lantern at the base, by means of the screw band d, permanently attached to the bottom of the globe substantially as specified.

Third, The upper rod of a guard detachable from the dome when made of a spun screw-band substantially as and for the purposes specified.

63,011.—HORSE HAY RAKE.—Manlove Butler, Vernon, Ind.

First, I claim the piece A, when constructed with the hooks f f, and bag g, and attached to the lever c, and arranged to operate in combination therewith substantially in the manner and for the purpose set forth.

Second, The hinge attachment d, which permits the lever to be laid along side of the head of the rake, all arranged and operating as set forth and described.

63,012.—MACHINE FOR FORMING EAVES TROUGH.—Allen Calkins and Wm. Tower, Almont, Mich.

First, We claim the combination of the bars B and C, with each other and with the frame A, of the machine substantially as described and for the purpose set forth.

Second, The combination of the bars, D E F, with each other and with the frame, A, of the machine, substantially as described and for the purpose set forth.

Third, The combination of the die G, sliding block H, nippers I, rope J, shaft L, gear wheels M, N, and crank O with each other, and with the frame A, of the machine substantially as described and for the purpose set forth.

Fourth, The combination of the die P, guide T, bar U, nippers I, rope J, shaft L, gear wheels M, N, and crank O, with each other and with the frame A, of the machine, substantially as described and for the purpose set forth.

63,013.—BEER COOLER.—David Cammerer, Cincinnatti, Ohio.

I claim the arrangement of the tubes, A B C D etc., decreasing in size from the bottom upward, the separate troughs, N N' and projecting flange g substantially as and for the purposes set forth.

63,014.—STEAM GENERATOR.—Luther W. Campbell, Aurora, Ill.

First, I claim the receiver for water or other liquid, constructed and arranged, operating inside of a superheating steam generator which is exposed directly to the fire, substantially as and for the purpose explained.

Second, A receiver E, constructed so as to form two or more parts combining an inner lining and an outer jacket, the lining having no top and the outer jacket no bottom, with a space between them of suitable capacity to form a steam passage substantially as described.

Third, The combination of the receiver E, the cone or cap F', and the feed water pipe E, with a superheater, substantially as described.

Fourth, The receiver E, with the blow-off pipe G, in combination with the superheater D, substantially as described.

Fifth, The receiver E, in combination with the cup E, and the blow-off pipe I, substantially as described.

Sixth, In combination with the superheating steam generator constructed to operate substantially as described I claim the feed water regulator operating substantially as explained.

63,015.—HEAD BLOCK FOR SAW MILL.—William Carlton, Dunkirk, N. Y.

I claim the gear which operates the knee of a Head Block consisting of the bevel wheels D E, worm F, rack L, sleeve B, and lever G, arranged and operating substantially as described for the purpose specified.

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63,016.—Post Augers.—Henry W. Caswell, Yarmouth, Maine.

I claim combining with a post-auger an air tube substantially as and for the purposes specified.

63,017.—Hand Stamp.—N. L. Chamberlain, West Roxbury, Mass.

I claim the manner herein shown and described of attaching the ink-ribbon to its shafts.

63,018.—Seed Drill.—James Chambers, Greensburg, Ind.

First, I claim the arms E E, made in the form described and connected to the frame A, in the manner and for the purposes herein specified.

Second, The arrangement of the frame A, with the diving wheel C, hoppers D D and D' arms E E, pipes h h, and seed pipes k' k, substantially in the manner and for the purposes herein set forth.

Third, The adjustable journal boxes, a a, when used as and for the purposes specified.

Fourth, The rock-shaft d, provided with the uprights e f e, and operating in three perforated wheels s', by means of their rods g g g, in the manner and for the purposes set forth.

Fifth, The arrangement of the rack bars H H, with the cog-wheels w and cog-shaft w', metallic band F, handle G, with spring n, for expanding or contracting the arms E E, with their attachments in the manner as and for the purpose specified.

Sixth, The hoppers D D, when used with their open tubes h h, and seed pipes k k, substantially as set forth.

63,019.—Combined Planter and Cultivator.—Isaac H. Chappell, Lawrence, Kansas.

First, I claim so arranging the crank lever, M, that when the plows are raised they will be thrown apart so that in turning the plows will not break down the corn.

Second, The standard, l, in combination with the bars, F F, for the purpose of elevating and lowering the plows without changing their angle.

Third, Attaching the bars, F F, to the standards, e e, for the purpose of elevating or lowering the ends of the bars, F F, so as to change the line of draft above or below the center of the axle, substantially as shown and described.

63,020.—Wagon Brake.—R. O. Codding and G. W. Pringle, Coddingville, Ohio.

First, We claim the pivoted lever, H, and rod or bar, M, operating the brake bar or shaft, I, and ratchet wheels, n n, substantially as herein shown and described and for the purposes set forth.

Second, We claim the ratchet wheels, n n, operating substantially as shown and described, in combination with the brake bar or shaft, I, as and for the purposes set forth.

Third, we also claim the spring, L, and neck yoke, G, in combination with pole or tongue, E, substantially as shown and described.

63,021.—Washer for Socket Bolts in Steam Boilers.—Joseph G. Collins, Boston, Mass.

I claim a washer constructed or formed substantially as herein shown and described, for the purpose set forth.

63,022.—Back Sight for Fire-arms.—Wm. Conner, Rensselaerville, N. Y.

I claim a spring sight, A A', guided in a metal plate, B, and constructed and operating substantially as and for the purpose herein shown and described.

63,023.—Churn.—James. J. Davelin, Philadelphia, Pa. Antedated March 5, 1867.

I claim the combination of dasher, N M and P O, constructed and held together by fastenings, A W C and D, with churn, B, the whole combined and acting in the manner and for the purpose above described and shown.

63,024.—Saw.—Chas. Disston, Philadelphia, Pa.

I claim the securing of detachable teeth in saw plates by means of the tapering arm. b', of a saw tooth, and the ring or washer, D, when both are constructed and adapted to openings in a saw blade, substantially in the manner and for the purpose described.

63,025.—Buck-saw Frame.—Henry Disston, Philadelphia, Pa.

I claim the guard, F, inclosing a portion of the rack, e, and connected to the bar, D, of the saw frame, all substantially as described, for the purpose specified.

63,026.—Process of Separating Metals.—Wm. Elmer, New York City.

I claim the process of treating metallic ores or other materials containing metals by the following three operations, performed successively upon them, viz: 1st, The oxidation of the oxidizable substances by treating the material while hot with a gaseous substance that supplies oxygen to them. 2d, The reduction of the oxides by treating the oidxized ores while hot with a gaseous substance that is incapable of oxydizing them. 3d, The process of separating the metals from each other by treating their mixtures at progressively increased temperature with a gaseous substance that has a higher affinity for oxygen than the metals have, so that the metals are fuzed in a non-oxydizing atmosphere in the order of their fusing temperatures, the process being conducted substantially as hereinbefore set forth. These three operations being performed in the order and substantially as hereinbefore set forth.

I also claim the process of treating metallic ores or other materials containing metals, by the following two operations performed successively upon them, viz: 1st, The reduction of the metallic oxides by treating the material while hot with a gaseous substance that has a higher affinity for oxygen than the metals to be reduced have. 2d, The fusion of the metals by treating the reduced ores while hot with a gaseous substance that is incapable of oxidizing them, these two operations being performed in order and substantially as hereinbefore set forth.

63,027.—Burning Fluid.—H. H. Etter, Washington, D. C.

I claim the ingredients, when mixed in the proportions as herein specified, for the purpose of producing a safe and brilliant light.

63,028.—Needle Wrappers.—David Evans, Studley, Eng.

I claim fastening and folding up of the needles in wrappers or papers that have flaps and folds as herein shown, so that the needles are easy of access from the outside without liability to drop or fall from the wrapper or to corrosion from contact with the fingers, as herein described and represented.

63,029.—Milk Can.—John L. Finch, Warwick, N. Y.

First, I claim the combination of the sheet iron outer case, B, with the body of the milk can, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the removable hoop, C, with the projecting lower end of the sheet-iron outer case, B, substantially as herein shown and described and for the purpose set forth.

63,030.—Washing Machine.—H. S. Forney, Baltimore, Md.

I claim in combination with a flanged metallic collar, f, in the lid, E, the bevel pinion or gear, I, made, arranged, and operating therewith and with the drive gear and the agitator or stirrer, substantially in the manner and for the purpose described.

63,031.—Apparatus for the Manufacture of Vinegar.—Andre Foubert, New York City.

I claim the manufacture of vinegar from the vapors of wine condensed and acidified in substantially the manner specified.

63,032.—Galvanic Battery for Remedial Uses.—Herman Fritz, Cleveland, Ohio.

First, I claim air and water-tight case, A, connecting bridge, G, rods, R, in combination with zincs, E, and covers, B, as arranged and for the purpose set forth.

Second, The insulating washer, I, connecting screw, F and M, and insulating washer, K, as arranged in combination with the arm, L, and foot plates, N, and insulator, N', for the purpose and in the manner specified.

Third, The screw, M, insulating washer, I, as arranged in combination with the screw, F, zinc, E, and bridge, G, for the purpose and in the manner described.

63,033.—Sewing Machine Attachment for Marking Tucks.—H. W. Fuller, New York City.

I claim, First, The employment of the nipping fingers to form ridges or creases in fabrics for the purposes specified, when arranged with respect to and operating upon the fabric substantially in the manner described.

Second, The combination with the marking device described of the plate, F, for the purpose specified.

Third, The use of the screw, 4, or its equivalent, to adjust the fingers to the fabric, as specified, and to determine the amount to be seized.

Fourth, In combination with the marking device possessing the functions and mode of operation described the spring, B, arm, C, and auxiliary arm, D, or its equivalent, as specified.

Fifth, In combination, the said marking device, the bed plate, E, or equivalent, and a feeding device, for the purposes specified.

Sixth, In combination, the marking device, bed plate: feeding device, and a stitch-forming mechanism, substantially as and for the purpose specified.

Seventh, So constructing and combining the arm, C, and spring, B, as to be adjustable for various widths of tucks or plaits, in combination with the marking device.

Eighth, The supplemental spring, B', and its screw, B2, or their equivalent, for the purpose specified.

Ninth, In combination with the aforesaid marking device, a suitable gage, F.

63,034.—Bending Machine.—E. D. and W. K. Gird, Cedar Lake, N. Y.

First, We claim the disk, C, and the jaws, a a, in combination with the cross head bar, b, substantially as described.

Second, The belt shifter, n, in combination with the slots, c c, in the fly wheel, and the disk, C, substantially as and for the purpose herein set forth.

63,035.—Portable Tree Box.—H. A. Graef, Brooklyn, N. Y.

I claim, First, A portable tree box formed of slats or strips, a a, fastened to bands or hoops, b b, and secured to the tree by lashings, d d, constructed and arranged substantially as and for the purposes herein described.

Second, The hooks or bands, b b, fastening by buttons or slots or their equivalents, in combination with sectional hoops or bands, b' b', for enlarging the size of the box, substantially as herein set forth.

63,036.—Manufacture of Bleaching Powder.—Thomas Gray, Union Road, Eng.

I claim the application, as before stated, for the purposes of bleaching fabrics or fibers or other materials without destroying or injuring them, substantially, as described.

63,037.—Hay Elevators.—E. C. Green, Plainfield, Ind.

I claim, First, The hoisting apparatus herein described, in combination with the wagon bed, A, arranged and operating substantially as and for the purposes herein specified,

Second, The hollow center post, B, inclosing the hollow center standard, D, with its cross arm, E, and pullies, d d, in combination with the slide roller, F, with its pulley, s, and spring, l, connected with the horse rake, G, and operated by the rope, e, constructed, arranged, and operating together substantially as and for the purposes herein described.

Third, The crank, n, in combination with the slide roller, F: and the spring, p, constructed and arranged substantially as and for the purposes set forth.

63,038.—Seed Planter.—J. Deloss Green, Antrim, Ohio.

I claim, First, Providing the spokes, H H, with adjustable supplementary spokes or bars, F, which carry seed boxes and slides, as and for the purpose herein set forth.

Second, The arrangement of the overlapping and adjustable bars, C c', with the cams, G G, and seed slides, e e, substantially as and for the purpose specified.

Third, The automatic covers, K, upon the ends of the supplementary spokes, F, for the purpose of discharging the grain, substantially as specified.

63,039.—Connecting Rods for Machinery.—Thomas Hall, Bergen, N. J.

I claim the combination of the rod, A, the sliding piece, B, with wedge-shaped bearing, and screw, C, when the same are arranged and operate substantially as described.

63,040.—Buckle.—E. Hambujer, Detroit, Mich.

I claim a buckle constructed of a single piece of wire, the ends of which constitute the tongues, being coiled upon each other in the rear and bowed thence toward their points, substantially as described.

63,041.—Trunk Lock.—Wm. J. Hare, New York City.

I claim the spring jaws, C, in combination with a stud, D, one or more wedges, E, and a key, K, constructed and operating substantially as and for the purpose described.

63,042.—Horse Hay-Fork.—O. J. Hardgrove, Canton, Ohio. Antedated March 10, 1867.

I claim the case, A, shaft, B, thimble, d, with prongs, a a and a', and spring, b, when constructed, arranged, and operating in the manner as and for the purposes specified.

63,043.—Mode of Reducing Vegetable Fibrous Substances.—James R. Haskell, New York City.

I claim the combined process of treating vegetable fibrous substances consecutively and by relation of each process to the preceding and following process in the form and manner and for the purposes, substantially as hereinbefore described.

63,044.—Mode of Treating and Separating Vegetable Fiber.—James R. Haskell, New York City.

First, I claim the mode of producing a vacuum or partial vacuum by first steaming the vegetable fibrous material under pressure and expelling the air, and then condensing the steam with a shower of cold lye which causes a rapid absorption of the lye in every part of the plant in the manner and for the purposes substantially as hereinbefore described.

Second, I claim the mode of treating vegetable fibrous substances in the form and manner and for the purposes, substantially as hereinbefore described.

63,045.—Steam Engine Oil Cups.—Moses Hawkins, Birmingham, Conn.

I claim an oil cup, A, provided with a stand pipe, D, extending up to near the cup, E, and a water cock, f, the whole constructed and operating as described.

63,046. — Construction of Safes.—E. M. Hendrickson, Brooklyn, N. Y.

I claim using for such purpose and in the manner described, wires or rods, bent or coiled spirally, as herein shown and described.

63,047.—Corn Planter.—Curran W. Henkle, Washington, C. H. Ohio.

First, I claim the curved arm, J, operated through the medium of the loader arm, L, and lever, F, in combination with the hopper, H, provided with the tube, h, and the spout, I, all arranged to operate in the manner substantially as and for the purpose set forth.

Second, The valve, D, in the opening, a, in the plow, C, when arranged to operate in connection with the curved arm, J, substantially in the manner and for the purpose specified.

63,048.—Railroad Crossing.—Edward Hiserodt, Washington, Ill.

I claim the peculiar form and arrangement of the crossing chair, with the lips outside of the rail holding it to its position, with the commission of the lips on the inner side of the rail and the application of the cleats, h, as and for the purpose described.

63,049.—Car Coupling.—Humphrey Holden (assignor to A. S. Barber), Hartford, Conn.

I claim the combination of the draw head, A, with the block, E, springs, G and F, and the link, B, and pin, C, said parts being arranged for use, substantially as set forth.

63,050.— Cultivator.—Henry Howe (assignor to himself and E. R. Ford), Oneonta, N. Y.

First, I claim the pendants, D, and the manner of securing them to the plow beams, and frames, substantially as and for the purpose shown and described.

Second, The bars, E, in combination with the plow beams, E, and pendants, D, substantially as and for the purpose herein shown and described.

Third, The combination with the tongue, F, and drivers seat, G, of the plow beams, E, swivel braces, c, and doubletree, H, substantially as and for the purpose herein shown and described.

Fourth, The slotted tongue, F, made substantially as and for the purpose herein shown and described.

Fifth, The levers, I, and chains, h, for the purpose of raising the plows out of the ground and retaining them in that position, substantially as herein shown and described.

Sixth, The upright side frames, B, as arranged and connected with the horizontal cross bar, C and C' substantially as and for the purpose herein shown and described.

63,051.—Refining Petroleum, etc.—Fleury Huot, Perth, Amboy, N. J. assignor to himself and John Rogers, of N. Y. city. Antedated Sept. 19, 1866.

I claim, First, Separating the bone black and impurities from the oil by filtering the same through a centrifugal filter as specified.

Second, The centrifugal filter formed of two thicknesses of cloth with sheets of filtering paper between them as and for the purposes set forth.

63,052.—Machine for Setting Staves in Barrels.—C. B. Hutchinson, Auburn, N. Y.

I claim, First, The setting up of barrels, casks, etc., by suspending the chine hoop by means of a clamp or its equivalent in such relation with the head which is placed on a suitable frame or support, that the ends of the staves may be inserted between the head and chine hoop, substantially as shown and described.

Second, The adjustable table, D, constructed with a concave upper surface and of a diameter smaller than that of the barrel for the purpose described, substantially as specified.

Third, The combination of the clamp frame or support and gage when arranged substantially as and for the purpose set forth.

63,053. — Compensating Braces for the Springs of Vehicles.—Samuel Jackson, Newark, N. J.

I claim the application to the springs of wheel vehicles, of a stay or brace arranged as shown and described or in an equivalent way to compensate for the yielding movement of the spring.

63,054.—Burning Fluid.—W. W. Jacobs, Hagerstown, Md.

I claim a fluid composed of the ingredients hereinabove named, mixed together in and about the proportions described, and for the purpose specified.

63,055.—Treadle Cam for Looms.—Barton H. Jenks, Bridesburgh, Pa.

I claim constructing the grooved hub of a treadle cam, C, of two parts, substantially in the manner and for the purpose described.

63,056.—Seed Drill Teeth.—Samuel Keeler, Lancaster, Pa.

I claim the arrangement and combination of the curved arm, J, with the spiral spring, M, operating as herein described and for the purposes set forth.

63,057.—Brick Machine.—Philip H. Kells, Adrian, Mich.

First, I claim the combination of the annular mold bed, B, and the central support, C, substantially as described and represented.

Second, The arrangement of the throat piece, d, above the molds operating to pack in the clay and remove the superfluity, substantially as described.

Third, The arrangement upon the mold wheel of the two pug mills on opposite portions, substantially as described.

63,058.—Water Wheel.—T. J. Kindleberger, Eaton, Ohio.

First, I claim the wheel having its plates and their buckets constructed, operated and arranged as herein described.

Second, The combination and arrangement of the plate, C, arm, D, worm wheel, E, and bevel gear with the hand wheel, F, for operating the gates as set forth.

Third, The combination of the rod, a, box, b, and spiral spring, m, with the set screw, o, arranged to operate as and for the purpose set forth.

Fourth, I claim constructing the crown plate, B, with the recesses or notches in its periphery, as shown and described, the outer points of said plate being arranged to protrude even with the periphery of the annular rim, A, as and for the purpose herein set forth.

Fifth, I claim constructing the gate, H, with the outwardly projecting arm, r, for the purpose of attaching the spring box, b, thereto, as shown and described.

63,059.—Plow.—Charles Kinkel (assignor to Alexander Wehle), New York City.

First, I claim the general construction of the plow, consisting of the plow frame, C, in connection with the axle, D, the plow beam, B, screw tree, F, and shaft, H, substantially as described.

Second, The plow frame, C, in combination with the screw tree, F, and universal joint, G, substantially as set forth.

Third, The universal joint, G, applied to the plow beam B and screw tree, F, substantially as described.

Fourth, The movable axle, D, in combination with the plow frame, C, substantially as described.

Fifth, The application of my improvement to plows of the usual construction by means of the cast iron shoe, R, substantially as described.

63,060.—Book Keepers Ruler.—A. O. Latham, Wheeling, W. Va.

I claim the combination of the secondary ruler, B, with the main ruler, A, the former swiveling upon a pin at or near the center of the latter, substantially as and for the purpose specified.

63,061.— Low-water Indicator.— W. H. Laubach (assignor to himself and W. S. Cooper), Philadelphia, Pa.

First, I claim the weighted lever, E, controlled by a float or weight g, and having a projection adapted to a catch or hook on the end of the lever, D, in combination with the pawl, K, arm, c, weighted arm, c', and whistle, H, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The weight or float, g, and its projection, y, arranged to operate in the interior of the glass tube, B, as and for the purpose herein described.

63,062.—Carpenters Gage.—Peter Lawyer, Richmondville, N. Y.

I claim the combination of the cam lever, E, lever spring, D, plate, C, flanged and slotted metallic eye, B, substantially as described for the purpose specified.

63,063.—Safety Guard for Door Locks.—Rufus K. Lee, New York City,

I claim the movable guard plate or pin entering the latch or bolt outside the case, in the manner and for the purposes set forth.

63,064.—Harness.—Jacob B. Lindeman, Manor Trop, Pa.

I claim the combination and application of the breeching, A, and stay strap, B, when affixed to the shafts of a vehicle, in the manner and for the purpose specified.

63,065.—Wardrobe Bedstead.—S. C. Maine, Boston, Mass.

I claim as an improved bedstead and bed the balance spring, a, or its equivalent, attached to shaft, b, by chains, or their equivalent, in combination with frames or cases as shown in Fig. 1 and 2, and operated substantially as set forth.

63,066.—Bed Bottom.—David Manuel (assignor to himself and Willard Manuel), Boston, Mass.

I claim the arrangement of the compound wire springs having spiral ends, a a, attached to the frame of the beadstead, A, and held by the cords, b b, and having also long curved sides, c c, connected with the slats, B, by the hooks, d, formed, combined and operating substantially as and for the purposes herein described.

63,067.—Gate.—John W. Martin, Washington, D. C.

First, I claim the combination of the tubular portion, E, with a step, F, and pintle, J, said parts, E and F, being constructed with spirally included abutting surfaces and applied to a gate post, substantially in the manner and for the purposes described.

Second, In combination with the spirally inclined tubular portion, E, and the step, F, formed of cast or hardened metal, I claim the wrought metal pin, J, substantially as and for the purposes described.

63,068.—Ice-cream Freezer.—H. B. Masser, Sunbury, Pa.

First, I claim the device of a catch, k, or its equivalent, for locking and unlocking the beater shaft, h, in combination with the gear wheel, b, by means of which separate or alternate motions may be given to the beater and the freezing can, A, or both together, arranged and operating substantially as and for the purposes herein described.

Second, The India-rubbed packing, m m, fitted on the edge of the beater wing, g, arranged and operating substantially as and for the purpose specified.

63,069.—Railway Joint.—A. S. McClure, Duncannon, Pa.

I claim the construction of the ward rail, B, when fitted into the flanges of the main rails, A, and fastened and supported by the guard plate, C, as herein described and for the purposes set forth.

63,070.—Car-axle Box Cover.—Richard McDowell, Lambertville, N. J.

I claim, First, An axle box having a projecting ring in front provided with tapering flanges, b, receiving the cap, B, with corresponding flanges, c, having an operating weighted handle, d, in the manner described for the purpose specified.

Second, The weighted handle, d, arranged on the cover, B, for the purpose of holding the same in position, substantially as herein shown and described.

63,071.—Piston Packing.—James P. McLean, Brooklyn, N. Y.

I claim combining the cork, C, rubber, R, with or without the mineral coating and securing the same by means of metallic strips, all substantially as described and for the purpose set forth and shown in the drawing.

63,072.—Piston-rod Packing.—James P. McLean, Brooklyn, N. Y.

I claim packing the piston rod or shafting, R, of a steam engine with the steam by means of the sectional, N N', pad C C, and steam ports, U U, constructed and operated substantially as described and shown in the accompanying drawings.

63,073.—Packing for Manholes of Steam Generators —James P. McLean, Brooklyn, N. Y.

I claim the cork diaphragms (or rings) or sections thereof, coated with a non-combustible substance, for the purpose substantially as described and shown in the accompanying drawings.

63,074.—Churn.—John Megown, New London, Mo.

First, I claim the combination and arrangement of the pullies, F G, and band, L, or their equivalent, shafts, H J, cranks, I K, standard, E, and hinged lid, D, with each other and with the dasher handles, P, churn, B, and frame, C, substantially as described and for the purpose set forth.

Second, The combination of the box or cap, M, bolts, N, and nut, O, with the shaft, J, and standard, E, substantially as described and for the purpose set forth.

63,075.—Apparatus for Compressing Air.—J. B J. Mignon and S. H. Rouart, Paris, France.

We claim, First, the hercin-described apparatus for obtaining the compression or exhaustion of air, the same consisting of one or more reservoirs into and from which the compressing and exhausting agent is conducted so as to compress or exhaust the air within the same by means of supply and exhaust pipes and regulating valves, arranged and operating substantially as shown and set forth.

Second, The combination with two or more reservoirs, arranged as described, of the air and water supply and exhaust pipes and their operating valves, connected with the said reservoirs, in such manner as to effect the continuous compression or exhaustion of air, substantially as specified.

Third, The combination with one or more air-compressing reservoirs, as described, of a hollow pillar or other tubular receptacle for the dispatches, or other objects to be transmitted through the tubing, under the arrangement and for operation as herein set forth.

63,076.—Bung for Casks, Barrels, etc.—John Miller, Buffalo, N. Y.

I cloim, First, The metallic box, A, expanding inwardly to receive the plug, B, when employed as a lining for bung holes, and constructed substantially as described.

Second, The plug, B, when provided with the head, h, and enlarged end, g, and combined with the packing ring, F, and box, A, substantially as set forth.

Third, The handle and driver, K, constructed and operating with the other parts, as described.

63,077. — Curved Corrugated Steel Plates. — Richard Montgomery, New York City.

I claim as an article of manufacture curved corrugated steel for the construction of steam chimneys, furnace and flues for steam boilers and for other purposes, substantially as described.

63,078.—Railroad-track Lifter.—John Morton, Winchester, Ind.

I claim, First, A combination of levers, E and G, fulcra, D1 and D2, and hooks, F, constructed and arranged to operate substantially in the manner and for the purpose set forth.

Second, The combination of the crossed levers, E, and slotted adjustable hooks, F, substantially in the manner and for the purpose set forth.

63,079.—Hay Rake—John I. Munroe, Burlington, Mass.

I claim the combination of the divider J K L M N, chain R, or equivalent lever P, teeth E, and frame of the rake with each other substantially as herein shown and described and for the purpose set forth.

63,080.—Saw Mill.—Isaac H. Newton, Oakfield, Mich.

First, I claim the hook M, suspended from the bent or loaded lever L, in combination with the operating mechanism for turning the log upon the carriage, substantially as herein set forth.

Second, The tilting blocks D, furnished with inclined or cam shaped ends d, and combined in relation with the sliding blocks E, and frame J, substantially as herein set forth for the purpose specified.

Third, The rock shaft H, and cams G, in combination with the sliding blocks E, and tilting blocks D, and frame J, substantially as herein set forth for the purpose specified.

Fourth, The arrangement of the bent lever L, hook M, and cord N, with reference to each other and with the wheel P, and rock-shaft H, substantially as herein set forth for the purpose specified.

63,081.—Boat Detaching Tackle.—Milton V. Nobles, Elmira, N. Y.

I claim, First, in combination with a boat detaching apparatus, a bail, bar or brace connected to the sides of the boat, so as to prevent the boat from tipping, when unevenly loaded, substantially as described.

I also claim hinging the bails by which the boat is steadied, at the sides, so that when let go or disconnected they will drop and lie upon the decks and thus not incommode or endanger the passengers or crew as described.

63,082.—Boat Detaching Tackle.—Milton V. Nobles, Elmira, N. Y.

I claim the combination of the detaching apparatus with the brace, and with the central suspension of the boat as and for the purpose herein described and represented.

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63,083.—CLOTHES TONGS.—Benedict Ott, La Crosse, Wis.

I claim the legs A, and handle B, with blades formed at right angles to them pivoted together at a, and provided with the spring b, which holds the legs A, open, constructed and arranged as herein set forth.

63,084.—DYEING AND PRINTING TEXTILE FABRICS AND COMPOUNDS THEREFOR.—Alfred Paraf, Mulhouse, France.

First, I claim as a new article of manufacture the arsenite of glycerine hereinabove described.

Second, The combination in the operation of dyeing or printing on textile fabrics or yarns, of the arsenite of glycerine, coal tar color, and acetate of alumina, magnesia, or other metallic oxide, substantially as and for the purpose hereinabove set forth.

63,085.—SPINNING JACKS.—F. R. Pearson, Germantown, Pa.

First, I claim actuating the belt shifter bar "f," in one direction by means of the twist gearing and in the other direction by the spiral spring the whole combined and arranged substantially as described and for the purpose set forth.

Second, I claim the combination and arrangement of the catch "e," loop "p," and faller "n," constructed as described and operated from the front of the carriage substantially as described and for the purpose set forth.

Third, I claim the combination of the rod "r," lug "O," catch "e," stand "h," and nut "t," when constructed as described for the purpose set forth.

63,086.—ADJUSTABLE HANDLE FOR FRUIT BOXES.—Cary Peebels, Santa Clara, Cal.

I claim a handle A, constructed with the arms b b, and the prongs c c, similar to that herein described substantially as and for the purpose set forth.

63,087.—COMPOSITION FOR COATING WOOD, CLOTH, METALS, AND FOR FORMING VARIOUS ARTICLES.—Antonio Pelletier, Parkersburg, West Va.

First, I claim the compound consisting of vegetable fibre, soapstone, silicate of soda or its equivalent red lead and litharge substantially as described and for the purpose set forth.

Second, The compound consisting of vegetable fibre, soapstone, silicate of soda or its equivalent red lead and litharge when coated on wood, cloth, leather, brick, stone, iron or other fibrous forms or solid substances and treated with a solution of muriatic acid consisting of one part of the acid to three parts of water, substantially as described and for the purposes set forth.

Third, I claim as a new article of manufacture the composition substantially as herein described and for the uses and purposes set forth.

63,088.—HOOPING CASKS.—Dan. Perry and Edwin Perry, Pawtucket, R. I.

We claim the concave hoop B, fitted permanently in channels or grooves on the outer face of the barrel, tub, pail, or other article made of wood and hooped substantially as described for the purpose specified.

63,089.—WOOD TURNING LATHES.—John Phillips, Jr., Chicago, Ill.

First, I claim the cylindrical bearing or holder B, or its equivalent in combination with the cutters E, arranged and operating substantially as specified.

Second. I claim the arrangement of the cutter G, with the cylindrical bearing B, or its equivalent operating as and for the purposes set forth.

63,090.—PRESS STRAINER.—John E. Phillips, Philadelphia, Pa.

I claim the perforated cylinder d, and band cover, e, in combination with the disks strainers and a screw plunger and base plate a, operated substantially as described for the purposes specified.

63,091.—TRUSS.—William Pomeroy, New York, N. Y.

I claim the construction, combination and arrangement of the pad spring F, with the pad E. and main spring B, of the truss, substantially as herein described and for the purpose set forth.

63,092.—SLEEVE SUPPORTER.—Thomas Powell, Milroy, Ind.

I claim the elastic band B, provided at one end with the ring C, through which it passes after encircling the arm above the elbow and having at its lower end the hook D, adapted to catch in the slit of sleeve as herein described and represented.

63,093.—STOVE COVER FOR COOKING STOVES.—Seymour Raymond (assignor to himself and J. Campbell), Middletown, Pa.

I claim the reversible pot-hole division plates in the upper plate of a cook stove constructed and operating substantially as and for the purpose herein described.

63,094.—STALL FOR ROASTING ORES CONTAINING SULPHUR, ETC.—John T. Reese, Baltimore, Md.

I claim an Ore Stall with a roof a, by arch or otherwise, a closed front by doors b b, the arrangement of draft parts d d, the arrangement of fume ports e e, and f, the connection of stack s, and culvert h, with culvert i, and main culvert and stack, this process of confined roasting a long and crooked main culvert, and the process of securing sediment by the bends, the rough walls or the obstructions in the culverts.

63,095.—BEDSTEAD FASTENING.—Adam H. Rennie, Binghamton, N. Y.

I claim the mode of constructing, arranging, and combining oblique dowelled pin joints with the eccentric clasp, D, substantially in the manner herein described and represented.

63,096.—TEMPERING STEEL AFTER IT HAS BEEN WELDED TO IRON FOR CUTTING TOOLS.—Asa R. Reynolds, Auburn, N. Y.

I claim tempering steel that is welded on iron, such as shear blades, plane irons, chisels, axes, or hatchets, and other cutting tools, by means of a reactionary blow produced by a drop die, or hammer, substantially as herein described and represented.

63,097.—WELDING STEEL TO MALLEABLE IRON AND TEMPERING THE STEEL BY ONE OPERATION.—Asa R. Reynolds, Auburn, N. Y.

I claim welding steel to malleable or wrought iron, and tempering the steel by one and the same process or operation, viz: by submitting the two metals, in a properly heated condition, to the action of a drop die, and the reaction thereof, with the under or anvil die, and the metal held between them, substantially as described.

63,098.—FIREPLACE.—Israel I. Richardson, Delaware, Ohio.

I claim the arrangement of the open grate, A, chambers, E, recessed in the jamb, and with perforated front doors and reverberating flues, D D, as described and represented.

63,099.—FOUNTAIN.—John Ross, Greenville, Mich.

I claim the combination and arrangement of the receiver, D, chambers, A and B, jet pipe, h, pipe c, air pipe, d, pipe, e, pump, E, pipe, f, stop cocks, g h and i, substantially as described for the purpose specified.

63,100.—FENCE.—John H. Rowley, Fabius, N. Y.

I claim the arrangement of the panels, A A, with the braces, E E, adjustably hinged to the said panels and the sliding bar, D, the several parts being constructed and used substantially in the manner and for the purpose herein specified.

63,101.—TOWEL RACK.—C. W. Royse, Peterborough, N. H.

I claim the frame, C, hung in projecting pieces, E, of a block or plate, F, in combination with the arm, G, having set or thumb screw, H, substantially as and for the purpose described.

63,102.—POCKET IMPLEMENT.—John A. Russ, Springfield, Mass.

I claim, as a new article of manufacture, the instrument herein described, consisting of the various tools mentioned, combined and arranged substantially as herein set forth.

63,103.—FENCE GATE.—M. L. Salyards, Troy Grove, Ill.

First, I claim the peculiar arrangement of the ropes, D D, in combination with the gates, B B, substantially as and for the purpose described in the foregoing specification.

Second, The peculiar arrangement of the ropes, H H and I I, in combination with the gates, B B, substantially as and for the purpose described.

Third, The posts, G G, and weights, M M M M, in combination with the gates, B B, substantially as and for the purpose described.

Fourth, The rollers, C C C C, in combination with the gates, B B, substantially as and for the purpose described in the foregoing specification.

63,104.—MATCH BOX.—Louis Schoerken, Koln, Prussia.

I claim connecting the hinged part, D, of the cover, C of an inner sliding box with the back, a, of an outer case, by means of an elastic band or strap, substantially as and for the purposes described.

63,105.—COTTON BALE TIE.—Daniel M. Sechler, Cincinnati, Ohio.

I claim the arrangement of the buckle, A, constructed with notched slot, 4. 5, and the loop, B, adapted and proportioned to engage with the buckle, substantially as described and represented.

I claim the loop, B, for attachment to one end of the hoop and adapted to lock within a buckle or equivalent device on the other end of the hoop.

63,106.—NAIL HAMMER.—George Selsor, Philadelphia, Pa.

I claim the combination, substantially as described, of the claws, c, with the plane of a hammer, for the purpose specified.

Second, The groove, x, in the pane beneath the claws, for the purpose described.

63,107.—CLOTHES SPRINKLER.—Ira W. Shaler, Brooklyn, N. Y.

I claim as a new article of manufacture the dampener described, when constructed substantially as set forth.

63,108.—PAD PLATES FOR HARNESS.—P. Shaw and E. S. Dawson, Syracuse, N. Y.

We claim as an article of manufacture the pad plate herein described, the same consisting of the struck up plate of steel, A, strengthening plate of malleable iron, B, combined and provided with the loop, G, substantially as and for the purpose specified.

63,109.—HAT-BLOCKING MACHINE.—Julius Sheldon (assignor to himself and W. C. Griswold), New York City.

First, I claim the bars, f, provided with notches, g', for the purpose of adjusting said bars to all depths of hats, substantially as described.

Second, I claim the slides, l, provided at one end with pins, g, which act as the fulcra of bars, f, and having their inner ends so arranged with the cone, n, as to be adjustable substantially as described.

Third, The ring, k, provided with a surrounding elastic cushion to adapt it to the two functions of breaking the band and giving the pressure to the clamps, substantially as described.

Fourth, I claim the ring, p, disconnected from but arranged to operate the clamps, l, substantially as and for the purpose specified.

63,110.—STOVE-COVER LIFTER.—Amos Shepard, Plantsville, Conn.

First, I claim a cast metal stove-cover lifter with the perforated hollow and notched socket or ferrule, substantially as described.

Second, I claim casting the herein described perforated hollow socket or ferrule in the manner and by means substantially as described, for the reception of wood handles.

63,111.—CORN HARVESTER.—James Shobe, Principio, Md.

I claim the combination of the revolving cutters, I I, receiving guides, f h, gathering belts, m g, standards, k b, and cross arms, K K, for holding the gavels, the forked hook catch, M, and foot lever, R, for liberating, as herein specified.

63,112.—CORN SHELLER.—Isaac B. Siddle, Caswell County, N. C.

I claim the improved corn sheller herein described, composed of the plate, A, with teeth, b, or their equivalent, the whole arranged to operate substantially as described.

63,113.—WINDOW FASTENING.—J. D. Smith, Naugatuck, Conn.

I claim the combination of the slide bolt, C, with the thimbles, D D', provided with screw threads on their exterior surfaces, substantially as and for the purpose herein set forth.

63,114.—SAW MILL.—Josephine Stewart, Owossee, Mich., administratrix of the estate of R. L. Stewart, deceased.

I claim the pitman, E, pivoted at its center to the pivoted arms, G, at its outer end, to the arm, d, and at its inner end to the pitman, D, constructed and operating substantially as described, for the purpose specified.

63,115.—APPARATUS FOR DISTILLING PETROLEUM.—A. H. Tait and J. W. Avis, New York City.

First, We claim the arrangement of partitions, a, in the still, A, said partitions being provided with apertures, c, at or near their bottoms, and with apertures, d, at or near their tops, substantially as and for the purpose described.

Second, Placing the apertures, c, at or near the bottoms of the partitions, a, in a zigzag position, substantially as and for the purpose set forth.

Third, The arrangement of valves, e e', in the top parts of the partitions, a, substantially as and for the purpose described.

Fourth, The arrangement of two or more condensers, C C', in combination with the compartments, b b1 b2 b5, of the still, A, and with valves, e e', regulating the communication between said compartments substantially as and for the purpose set forth.

Fifth, The equalizing pipe, n, in combination with the compartments, b b5, of the still, A, substantially as and for the purpose described.

Sixth, The gates, i i1 i2, in combination with the compartments, b3 b4 b5, of the still, A, substantially as and for the purpose set forth.

Seventh, The combination of coking or tar retorts, E E', with a still, A, divided into a number of compartments, b b1 b2, b5, substantially as and for the purpose described.

63,116.—PROCESS AND APPARATUS FOR THE FERMENTATION OF SACCHARINE LIQUIDS.—A. H. Tait & Joseph W. Avis, New York City.

First, We claim effecting the fermentation of saccharine solutions or liquids in vacuo.

Second, The arrangement of the force pump or fan blower, in combination with a suitable refrigerator and with the fermenting tun for the purpose of cooling the wort as set forth.

Third, The arrangement of a steam pipe in combination with the tun, A, refrigerator or condenser, C, and receiver, D, substantially as and for the purposes described.

63,117.—BRAIDING ATTACHMENT FOR SEWING MACHINE.—Joseph Thomas, New York City.

I claim the arrangement of the plate, m, forming part of the braiding plate, A, and capable of opening and shutting to facilitate the passing in of the braid, and provided with a groove. s, on its underside to guide the braid, the whole being constructed in the manner and for the purpose set forth.

Second, I claim the arrangement and use of the frame, D, with rollers, B and B', or their equivalent at the ends, and the manner of stretching the material upon the same, for the purpose substantially as described and set forth.

63,118.—PUMP VALVE.—H. Tyler, Gaines, N. Y.

I claim the valve, N, attached to the end of the sliding rod, L, by means of the nut, d, so as to furnish the said valve to play on the rod as herein described, piece, M, and guides, b b, when all are constructed and arranged as herein set forth.

63,119.—HOP FRAME.—Jacob B. Van Dewerker, Cobleskill N. Y.

I claim a hop frame composed of the vertical stakes or poles, A, and inclined bars, B, the latter being connected to the former and arranged relatively therewith, substantially as shown and described.

63,120.—WINDOW-SASH SUPPORTER.—Richard Vose, New York City.

I claim a thumb piece and crank united to form one piece when supported by a simple divided plate, C, upon a window sash and combined with a spring catch upon the end or side of said sash by means of a connecting cord or wire all substantially in the manner and for the purpose herein set forth.

I claim also the combination of a pin, r, with a spring catch, e, as herein described when said pin is made to project in or through a slot cut in the sash, all substantially as and for the purpose herein set forth.

63,121.—BOOTJACK.—James Walker, Cincinnati, Ohio.

I claim a self-adjusting bootjack composed of the two jaws, D D', with the curve linear slots, E E', sliding between two plates, A, and B, so as to be closed by the action of withdrawing the foot from the boot, substantially as set forth.

63,122.—ATTACHING THILLS TO WAGONS.—Theodore Wallis, A. B. Mattoon and Chauncey E. Tutler, Auburn, N. Y.

We claim the shackle, A, when provided with a receptacle as described in combination with slide, C, as constructed and both being employed, in the manner and for the purpose set forth.

63,123.—INSTRUMENT FOR DRAWING ELLIPSES.—Aaron Warr, Lockport, N. Y.

I claim the combination with a pair of dividers of the pen and pencil carrier, f, jointed to a sleeve, e, or equivalent, which enables the device to slide up and down and turn upon the inclined bar or leg, B, of the dividers, arranged and operating substantially as set forth.

I also claim, in combination therewith, the double brace, C, consisting of the legs, h h, collar, i, and set screw, n, substantially as and for the purpose specified.

63,124.—BURGLAR ALARM.—C. Waterman, New York City.

First, The rod, G, connected by a pivot or any suitable joint, to the arm, F, and the door, A. and arranged in relation with the hammer rod, B, of an ordinary bell alarm, to operate in the manner substantially as and for the purpose set forth.

Second, The hook or fastening, C, in combination with the hammer rod, B, and the other rod, G, substantially as and for the purpose specified.

63,125.—APPARATUS FOR DRAWING IRON FROM THE FIRE.—David N. Williams, Chicago, Ill.

I claim the sliding drum, G, in combination with the traveller, C, chain, E, and tongs, F, all arranged to operate substantially in the manner as and for the purpose set forth.

63,126.—VALVE.—John Wilcox, Thompsonville, Conn.

I claim a valve, constructed, arranged and operating substantially as herein shown and described.

I claim the stop arrangement, a b, substantially as herein set forth in combination with a screw valve.

63,127.—FAUCET.—John Wilcox, Thompsonville, Conn.

I claim the faucet consisting of the shell, A. stem, C, socket, D, thimble, a, valve joint, B, and packing recesses, p, constructed as herein set forth for the purpose specified.

63,128.—VENEER CUTTER.—John B. Wilson, New York City.

I claim cutting a crimped or corrugated veneer, substantially as described for the purpose set forth.

63,129.—STEAM-ENGINE SLIDE VALVE.—Parker Wineman, Chicago, Ill.

First, I claim the application of a laterally expansible packing to a ring which is applied within a cup, B, upon the back of a slide valve, said ring being held against the valve chest back by the pressure of a spring alone while the packing is expanded by the pressure of steam, substantially as described.

Second, The detachable ring, a, grooved on its circumference and fitted with expansible packing in combination with the cup, B, for the purpose of packing a slide valve, substantially as herein set forth.

Third, The combination of the flanged ring, a, and its spring, b, with the expansible packing and its spring, h, applied within a cup, B, and operating substantially as described.

63,130.—VAPOR GENERATOR AND BURNER FOR HEATING PURPOSES.—Henry R. Foote, Oil City, Pa., assignor to himself Stillman C. Allen, and J. H. Winsor.

First, I claim a retort or vessel, a.

Second, A tank or means of supporting the retort, with the hydro-carbon oil or liquid.

Third, An apparatus for decomposing steam and introducing its gaseous constituents into the retort.

Fourth, An air pump, or means of forcing air into the retort.

Fifth, Means of discharging from the retort and burning the mixture of air, hydro-carbon vapor, and the gaseous constituents resulting from the decomposition of steam as set forth.

I also claim the combination of such combination, and the reservoir, b, applied thereto, and for use, substantially as described.

I also claim the employment of the vapors of a light and volatile hydro-carbon as set forth with the heavier oil, the air and gaseous constituents of steam introduced into the retort substantially as described, such light and volatile hydro-carbon, being placed in the air reservoir, b, so as to be vaporized therein by the air forced into and through it or by any other proper means, the vapors of such hydro-carbon, being carred by the air from the reservoir into the retort.

I also claim the admixture of gas of a hydro-carbon fluid, air and the gaseous constituents of steam and their combustion by the means, in the manner and for the purposes set forth.

I also claim the deflector or radiator, g, constructed as described and arranged in relation to pipes f, and elbow, f', as and for the purposes set forth.

I also claim the combination of the heating coil of pipes, p', or its equivalent, with the tank, c, the retort, a, a steam decomposing apparatus, and an air forcing apparatus, the whole being to operate substantially as set forth.

I also claim the arrangement of the oil tank, c, surrounded with the water jacket, t, with the retort, a, a steam decomposing apparatus and an air forcing apparatus, substantially as specified.

I also claim the combination of the drain pipe, k, with the retort, a, the tank, c, a steam decomposing apparatus, and an air forcing apparatus when combined for use as specified.

REISSUES.

2,509.—LAMP.—Wilmon W. Blackmar, Boston, Mass., assignee by mesne assignments of D. H. Chamberlain. Patented May 8, 1855.

First, I claim the combination of a perforated wick tube or chamber, B, with the body, C, of a lamp filled with a porous or absorbing material for the purposes set forth.

Secondly, An oil can constructed in the manner and for the purposes set forth.

2,510.—BILLIARD TABLE CUSHION.—Hugh W. Collender, New York City. Patented December 8, 1857. Reissued August 23, 1859.

I claim billiard table cushions composed of vulcanized india-rubber or allied gum, with a layer rendered less compressible than the body or back by the incorporation of fibrous or equivalent substances, the said layer and back or body having been united in the green or plastic state, and together vulcanized as and for the purposes specified.

2,511.—CUSHION FOR BILLIARD TABLE.—Hugh W. Collender, New York City. Patented January 12, 1858.

I claim uniting the parts employed in forming combination billiard cushion by placing the harder or more dense and less elastic substances in a mold, and allowing the melted rubber to flow against, around, or into the harder or more dense and less elastic substances, or causing the plastic rubber by pressure to unite with the same, and then vulcanizing the india-rubber, substantially as and for the purpose set forth.

2,512.—CUSHION FOR BILLIARD TABLE.—Hugh W. Collender & Michael Phelan, New York City, assignees of Hugh W. Collender. Patented September 25, 1860.

We claim making cushions for billiard tables of two thicknessess of what is known as the soft compound of vulcanized India-rubber, or allied gum, with an interposed thickness of what is known as the hard compound of vulcanized india-rubber, or allied gum, or, as the equivalent thereof, with an interposed thickness of the soft compound of vulcanized india-rubber, or allied gum, rendered hard by the admixture of fibrous or equivalent substances, substantially as and for the purpose specified.

2,513.—AUGER.—Ransom Cook, Saratoga Springs, N. Y. Patented June 17, 1851. Extended 7 years.

First, I claim constructing boring implements with their lips or cutting edges, as shown and described, that is, such lips commencing at the screw or point, and extending therefrom nearly at right angles until about half way from the center to the outer point, and then curving upwards and forward said curve being continued until the outer portion of the lip is nearly semicircular, or until it turns within the periphery of the tool.

Second, I claim a boring implement having its lips so formed as their cutting edges shall form a spiral line from the point where they begin to curve, to their outer extremity, whether the curved edge shall incline forward or backward, substantially as shown and described.

Third, I claim a boring implement, having its lips or cutting edges curved both in the horizontal and vertical planes, substantially as herein shown and described.

2,514.—FETTER AND HOPPLE.—Robert N. Eagle, Washington, D. C. Patented April 7, 1863.

First, I claim the devices substantially as described, for connecting the legs of an animal by a coupling whose mode of junction with the leg bands relieves the said leg bands of motion upon the leg, wholly or in part.

Second, I claim a bar or strap, B, or its equivalent, as a means of connecting the coupling, C, with the portion, A, embracing the leg substantially as described and represented.

2,515.—MACHINE FOR WASHING PAPER STOCK.—Horace W. Peaslee, Malden Bridge, N. Y. Patented January 23, 1855. Antedated September 20, 1854. Reissued January 8, 1856.

I claim a rotating perious cylinder, provided with projecting teeth on the inside, and mounted, substantially as herein described, so as to be sustained and rotated without a shaft and arms, that the inside and ends may be unobstructed for the passage of the stock, subs antially as and for the purpose described.

And I also claim, in combination with a previous rotating cylinder, armed with teeth on the inside, substantially as described, the means substantially as described for the introduction of water through the meshes of the cylinder to the stock inside, as and for the purpose described.

2,516.—STEAM GAGE.—Emmett Quinn, Washington, D. C. Patented March 13, 1866.

First, I claim the construction of a compound syphon steam gage, so that the movements of the fluids in each tube are therein confined and prevented from entering and mingling with those in the others during transportation, substantially as herein set forth.

Second, The combination with the gage of an index tube, of a less caliber than the other tubes, in said gage, substantially as herein described.

2,517.—MACHINE FOR PLANTING.—John G. Clark, Middletown, Ohio. Patented October 2, 1866.

First, I claim the toothed cylinder, B, in combination with a toothed reciprocating slide or slides, constructed arranged and operating substantially as described.

Second, The arrangement of the agitator in the hopper, C, above the toothed cylinder, operated by mechanism substantially as described.

Third, The combination of actuating gearing with the perforated slide, b, arranged to operate at the bottom of the hopper, conjointly with the cylinder B, to regulate the discharge of the seeds, substantially as specified.

Fourth, The stationary teeth, arranged tangentially in relation to the cylinder and ribs, e e, in combination with the positively operating devices for separating the seeds, substantially as described.

2,518.—MACHINE FOR SCOURING LEATHER.—P. Jewell & Sons, Hartford, Conn., assignees of Peter E. Hummel. Patented June 16, 1857.

First, We claim in the leather scouring machine a reciprocating tool stock, operated by a connecting arm, C, crank, D, or their equivalents, to actuate the tools, arranged therein successively upon the surface of the leather presented to their action.

Second, We also claim, in a leather scouring machine, a movable bed or table upon which the leather is placed, and held by atmosperical pressure for presenting said leather to the action of reciprocating tools.

Third, We also claim, in a leather scouring machine, suspending the mechanism upon which the tool stock reciprocates, to trusses, or timbers, directly over the movable bed or table, so as to produce firmness, and unobstructed access to the bed or table from all sides thereof.

Fourth, We also claim, in a leather-scouring machine, an automatic reciprocating tool stock, in combination with a horizontal movable bed or table for presenting the leather to the action of said tool stock.

Fifth, We claim, in a leather-scouring machine, a slitted lever, D, or its equivalent, in combination with the connecting rod, C, and reciprocating tool stock, to allow the back and forward movement of the said tool stock to be extended or contracted more or less, as desired.

Sixth, We also claim, in a reciprocating head of a leather-scouring machine, so arranging the tools therein as to be adjusted, vibrate, counterpoise, and graduate their action, for the purpose described, as may be desirable.

Seventh, We claim the bearings, e, arranged in the tool stock to impart yielding property to the vibrating tool stock, for the purpose described.

2,519.—APPARATUS FOR TANNING.—B. H. McNulty, Philadelphia, Pa., William Kern, Mansfield, Ohio, and Sterling Bonsall, Philadelphia, Pa., their assignee. Patented May 23, 1865.

First, We claim hanging the hides in a vat, and agitating the tanning liquor by means of a rotating dasher or agitator, substantially as and for the purpose described.

Second, Hanging the hides in a close water-tight vat, and agitating the tanning liquor by means of a rotary or otherwise moving dasher while the liquor is under pressure within said closed vat, substantially as described.

Third, We claim the combination of the water-tight vat, A, the dasher, E, and a force pump or other equivalent means of producing pressure within the vat, substantially as described.

Fourth, We also claim the dasher, E, located in the lower part of the vat in combination with the bars, B, or other equivalent means for hanging the hides in the vat, so that the tanning liquor when agitated by the dasher will freely permeate between the hides, substantially as described.

2,520.—KNIFE.—Ira Merritt, Abington, Mass., assignee by mesne assignments of himself. Patented June 7, 1859.

I claim the knife handle herein described, provided with means for clamping the blade, and for allowing the cutting edge or point to be adjusted with respect to the handle, substantially as set forth.

I also claim adjustable blades so made as to be fixed and held in different positions in the handle, substantially as set forth.

2,521.—MACHINE FOR CAPPING TACKS.—John C. Rhodes, South Abington, Mass. Patented July 10, 1866.

I claim, First, The rotating frame, A, having movable plungers, D, provided with spiral or other suitable springs, and stationary dies, C, in combination with one or more stationary cams, G, when all arranged together so as to operate substantially as and for the purpose described.

Second, The combination with the dies, C, of the clearers or discharges, g, stud, i, and spring, h, substantially as and for the purpose specified.

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2,522.—HARVESTER.—Adam R. Reese, Phillipsburg, N. J., assignee of Samuel Comfort, Jun., Morrisville, Pa. Patented April 1, 1856.

First, I claim, in combination with a harvesting machine, a platform to support the falling grain, made of slats, supported at one end only.

Second, A platform composed of slats supported at one end only, arranged to drop the gavel when a sufficient amount has accumulated thereon to form a sheaf.

Third, In combination with a harvesting machine, a platform which is automatically operated to discharge the grain at one side, and out of the way of the machine on the next round.

Fourth, In combination with a harvesting machine, a platform to receive the cut grain, so arranged as to swing around and drop the gavel at one side out of the way of the team and machine on the next round.

Fifth, In combination with the slatted platform, a device for receiving the cut and falling grain, while the gavel is being discharged.

Sixth, In combination with a slatted platform, a device automatically operated for supporting the falling grain while the gavel is being discharged.

Seventh, In combination with a platform made of slats, supported at one end only, a device for receiving and supporting the cut and falling grain while the gavel is being discharged.

Eighth, In combination with a slatted platform, a device which is supported at one end only for the purpose of forming a support for the cut and falling grain while the gavel is being discharged upon the ground.

2,523.—PROCESS OF OBTAINING THE EXTRACTIVE MATTER OF TAN BARK AND OTHER MATERIALS BY DISPLACEMENT.—W. H. Burridge, Cleveland, Ohio, joint patentee with J. Brainard, and assignee of Brainard's entire interest. Patented April 8, 1862.

First, I claim the process herein described for making extracts and for filtering purposes, which consists in dividing the material from which the extract is made, or which forms the filter into a series of horizontal layers or divisions, either with or without a perforated diaphragm, and which by suitable mechanical means fresh material may be introduced into the bottom of the column and the exhausted material discharged at the top.

Second, The introduction of water or liquid to be filtered at the top of the column, while the fresh material or filter is introduced at the bottom and discharged at the top, substantially as specified.

Third, Obtaining the extractive property of bark by the process herein described.

DESIGNS.

2,596.—SPOON HANDLE.—G. A. Eno, Philadelphia, Pa.

2,597.—WATER COOLER.—John L. Hadden, Phila., Pa.

2,598.—COFFEE AND TEA-POT TOPS.—George Jones, Saugerties, N. Y.

2,599.—SET OF SIGNAL FLAGS.—Henry J. Rogers, Baltimore, Md.

2,600.—AX HANDLE.—Imlay B. Viets, New Britain, Conn.

2,601.—PITCHER.—Andrew and Wilfred Dunworth, Dolbs' Ferry, N. Y.

2,602 to 2,605.—BURIAL CASE.—Charles Zeuner (assignor to Crane, Breed & Co.), Cincinnati, Ohio. Four Cases.

EXTENSIONS.

SEED PLANTER.—Geo. W. Brown, Galesburg, Ill.—Letters Patent, No. 9893. Dated Aug. 2, 1853, antedated Feb 2, 1853. Reissue, No. 526. Dated Feb. 16, 1858. Again Reissued, No. 1036, Sept. 11, 1860.

I claim a seed planting machine constructed principally of frame work, the front part of which is supported on not less that two runners or shoes, with upward inclining edges, and the rear part supported on not less than two wheels, the latter being arranged to follow the former, substantially as and for the purpose set forth.

SEED PLANTER.—Geo. W. Brown, Galesburg, Ill.—Letters Patent, No. 9893. Dated Aug. 2, 1853, antedated Feb. 2, 1853. Reissue, No. 526. Dated Feb. 16, 1858. Again Reissued, No. 1037. Dated Sept. 11, 1860.

I claim the construction of a shoe or runner, for seed planting machines, with an upward inclining edge, and its point sufficiently high or raised so that it will climb up and over, or cut or break through intervening obstacles, without materially forcing the earth laterally at its front part, and widening towards its rear end, so as to open out a gash or furrow in which the seed to be planted may be deposited, and long enough to furnish a support to the frame work, substantially as described.

SEED PLANTER.—Geo. W. Brown, Galesburg, Ill.—Letters Patent, No. 9893. Dated Aug. 2, 1853, antedated Feb. 2, 1853. Reissue, No. 526. Dated Feb. 16, 1858. Again Reissued, No. 1038. Dated Sept. 11, 1860.

I claim in combination with a seed planting machine constructed principally of frame work, with not less than two runners and not less than two wheels a hinged joint between the point of the tongue, and the rear part of the machine, so that one part of the frame work may be raised, lowered, adjusted, or supported on the other part, substantially as described.

SEED PLANTERS.—Geo. W. Brown, Galesburg, Ill. Letters Patent No. 9,893: dated Aug. 2, 1853; antedated Feb. 2, 1853. Reissue No. 526; dated Feb. 16, 1858. Again reissued No. 1,039; dated Sept. 11, 1860.

I claim a seed-planting machine wherein the seed-dropping mechanism is operated by hand, or by an attendant, in contradistinction from "mechanical dropping," the mounting of said attendant upon the machine in such position that he may readily see the previously made marks upon the ground and operate the dropping mechanism to conform thereto, substantially as herein set forth.

I also claim, in combination with a seed-planting machine composed substantially of frame work and upon which the person who works the seed slides or valves sits or stands, a lever or its equivalent, by which a driver or second attendant may raise or lower that part of the frame work which carries the attendant and the seeding devices, and thus ease the machine in passing over intervening obstacles or in turning around, substantially as described.

SEWING MACHINE.—James E. A. Gibbs, Steel's Tavern, Va. Letters Patent No. 1,206. Dated Feb. 21, 1860.

I claim the peculiar form and figure herein described and set forth as the design for a casting of a sewing machine.

KNITTING MACHINE.—Moses Marshall, W. Aldrich, and L. B. Tyng, assignees of M. Marshall, Lowell, Mass. Letters Patent No. 9,621; dated March 15, 1853. Reissue No. 1,801; dated Oct. 25, 1864.

I claim, First, Forming the stitches alternately on each side of the needle rests by two sets of needles placed at an angle to each other, and operating one needle at a time, substantially as described.

Second, The two plates or rests, e and f, or their equivalents, so arranged as to support the two sets of needles, and allow the fabric knit to pass between them, substantially as described.

Third, Connecting the cam boxes, i i, which actuate the opposite sets of needles by means of the arms, l l, or its equivalent, so as to give the proper alternate and relative movements to said sets of needles, substantially as described.

Fourth, Connecting the feeder which carries the thread with the arm which connects the cam boxes, substantially as and for the purpose set forth.

Fifth, Two sets of single and independent needles, crossing at an angle to each other, and those of each set moving in direct or parallel lines, and the two sets operating alternately on each side of said angle, substantially as and for the purpose described.

NOTE.—FIFTY-ONE Patents in the above list were secured through the Agency of the SCIENTIFIC AMERICAN.—[EDS.

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WASHINGTON, D. C., March 13, 1867. 13 3

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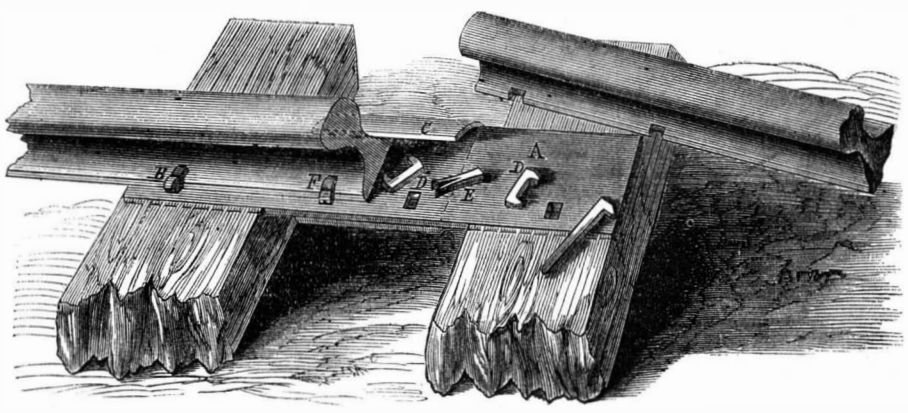
Improved Rail Joint and Base Plate.

Any device which shall lessen the enormous expense of repairs to the roadway and rolling stock of a road is valuable. Much attention has lately been given to the subject, both in Europe and this country, and there are a number of contrivances which, at least in part and temporarily, obviate this trouble and improve the road. One of the greatest sources of deterioration and cost is the unevenness of the road at the points of contact of the rails. The ends of the two rails are usually brought together on a sleeper and rest on a chair or clamp intended to hold them in line and on the same level. But they are not always efficient for this purpose.

The improvement illustrated in the engraving is claimed by the inventor to be superior to the ordinary modes of connecting rails. It is very simple and does not appear to be costly.



WEBB'S RAIL JOINT AND BASE PLATE.

A is a baseplate of wrought iron, extending across two sleepersand the space between them. It is somewhat wider than the base of the rail, sufficiently so to admit of the ordinary rectangular holes to be punched through. The base of the rail is laid close to the plain edge of the base plate. On this side both rail and plate are secured to the sleeper by the ordinary hook-headed spike. On the other side—the near side in the engraving—the rail and plate are secured by two spikes in each hole, one passing through the slot in the base of the rail and projecting its head over the rail, while the other is driven with the head reversed, this spike acting as a key, as seen at B.

The clamp C, is also of wrought iron, flanged on one edge to receive the edge of the rail, and passes under the base plate between the sleepers. The rails are secured to the base plate and the base plate and clamp are fastened together by gibs D, and split keys, E. The gibs are passed through the holes in the base plate and clamp, which correspond, and the key is driven through and spread on the other side, thus securing all firmly in place, as seen at F.

It will be seen that with the base plate and clamp there is a large amount of metal under the ends of the rails, and that while sufficient rigidity is secured, the ends of the rails are kept perfectly in line. This method is adapted to any form of rail, requiring only the ordinary spike and the punched holes. It can be readily attached to any broken rails by punching two holes without removing them from their place.

Patented through the Scientific American Patent Agency, Jan. 22, 1867, by Geo. Webb, whom address, Williamsport, Pa.

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On March 23d a bill passed the House authorizing the Commissioner of Patents to appoint from time to time such additional principal examiners and first and second assistant examiners as may be required to transact the current business of the Office with dispatch, not to exceed four additional of each class; also, a solicitor of the Patent Office, with a salary of $3,000, and fixing the salary of the first assistant examiner and disbursing clerk at $2,000, and the librarian (who also acts as translator) at $2,500. We trust that this important measure will pass the Senate without delay. Its adoption will secure for inventors a more prompt and energetic disposal of their cases. Push on the good work.

Prof. Loomis, of Yale, states that the average temperature in the month of February was seven degrees higher than the average for this month for the last eighty-eight years, and that it counterbalances the excessive cold of the two preceding months, so that on the whole the past winter must be ranked as an ordinary one.

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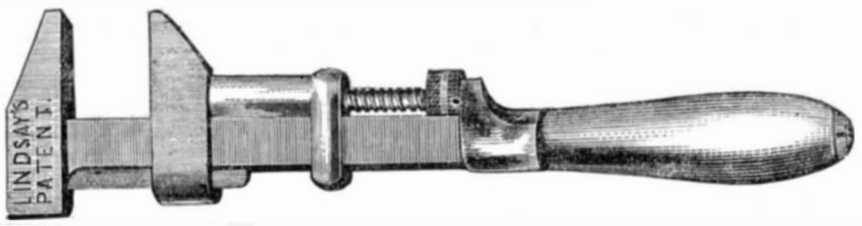

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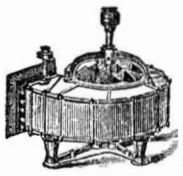

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